LAKE WASHINGTON WASTEWATER LAKE LINE MANAGEMENT PLAN

SEPA Draft Environmental Impact Statement

City of Bellevue
Utilities Department
450 110th Avenue NE
Bellevue, WA 98004

April 2023

City of Bellevue

Post Office Box 90012 ▪ Bellevue, Washington ▪ 98009 9012

April 6, 2023

Lake Washington Wastewater Lake Line Master Plan Draft Environmental Impact Statement

Dear Interested Parties:

The City of Bellevue Utilities Department is developing a management plan to identify long-term operational and capital improvement strategies for the future repair, replacement and maintenance of the existing sewer line located underwater or on land adjacent to Lake Washington. The Lake Washington Wastewater Lake Line (LWWLL) system includes 14.6 miles of sewer lines, as well as 15 pump/lift stations and 8 flush stations. Improvements included in the Management Plan to the LWWLL would be located along the shoreline of Lake Washington throughout the following jurisdictions: Bellevue, Beaux Arts, Medina, Hunts Point, Yarrow Point, and unincorporated King County.

The City of Bellevue Development Services Department is the Lead Agency under the State Environmental Policy Act (SEPA) for the proposal and is issuing this Draft Programmatic (non-project) Environmental Impact Statement (EIS) for the environmental review of the adoption of the Management Plan. The EIS has been prepared in accordance with Chapter 197-11 WAC.

The Draft EIS evaluates four alternatives:

- In-Water Alternative
- On-Shore Alternative
- Upland Alternative
- No Action Alternative

Bellevue Utilities Department is reviewing information about the lake line system to develop strategies for future repair, replacement, or maintenance for the six defined Service Areas in the Plan area. Some sections may not require work; others will require repair, replacement, or maintenance. The City will use the Lake Washington Wastewater Lake Line Management Plan to identify long-term operational and capital improvement strategies for the future repair, replacement, and maintenance of the existing sewer line located underwater or on land adjacent to Lake Washington. In combination with the identification of the preferred alternative (In-Water, Onshore, or Upland Alternative) for future repair and replacement of the aging system, further evaluation and analysis will be performed to determine the best-suited construction method(s) at individual location(s) to implement the operational and capital improvement strategies. Improvements at the pump stations will be evaluated in each Service Area as part of the alternative selection process. The City will select the alternative(s) to be implemented based on several evaluation factors such as environmental, regulatory, social, technical, and cost. Different alternatives may be selected depending on the Service Area.

Implementation of any projects identified in the Management Plan would require a number of permits and approvals from the local jurisdiction prior to construction.

A virtual public meeting on the Management Plan and a public hearing on the Draft EIS will be held Tuesday, April 18, 2023 from 5:00 to 6:00 p.m. The purpose of the public hearing is to provide an opportunity for individuals, agencies, and organizations to review information presented in the Draft EIS and to present oral or written comments on the Draft EIS. Attendees may sign up in advance or at the meeting to provide verbal comments during the meeting. https://us02web.zoom.us/webinar/register/WN_qDsbKptMRyyIRXROKbvuFw. The meeting will be recorded and transcribed, and responses to the comments will be provided in the Final EIS.

The Draft EIS and additional background materials are available for viewing online and can be downloaded from the City's website at https://bellevuewa.gov/city-government/departments/utilities/utilities-projects-plans-standards/capital-projects/lake-washington-line.

Thank you for your interest in the Lake Washington Wastewater Lake Line Master Plan.

Sincerely,

Elizabeth Stead

Elizabeth Stead
Land Use Director and SEPA Responsible Official

Fact Sheet

Proposal Title

Lake Washington Wastewater Lake Line (LWWLL) Management Plan (the Management Plan, or the Plan)

Proposed Action

The following alternatives were identified for evaluation in this EIS:

- In-Water Alternative
- On-Shore Alternative
- Upland Alternative
- No Action Alternative

Location

Improvements included in the Management Plan to the LWWLL would be located along the shoreline of Lake Washington throughout the following jurisdictions:

- Bellevue
- Beaux Arts
- Medina
- Hunts Point
- Yarrow Point
- King County

Plan Proponent and Lead Agency

City of Bellevue
Bellevue Utilities
450 110th Avenue NE
Bellevue, WA 98004

Project Information / Background Data Contact Person

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SEPA Lead Agency, Responsible Official, and Contact Information

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Elizabeth Stead, Land Use Director and SEPA Responsible Official
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Authors and Principal Contributors to this EIS

This Draft Environmental Impact Statement (EIS) has been prepared under the direction of Bellevue Utilities. The following consulting firms provided research and analysis associated with this EIS:

- **ESA** – Lead EIS consultant, document preparing; writing of all EIS sections.
- **Carollo Engineers, Inc.** – Lead Management Plan consultant, writing and analysis of the Management Plan.
- **Confluence Environmental Company** – Assisting consultant, writing and preparing the Management Plan Aquatic Impacts Assessment.
- **Ahern Management Consulting** – Technical consultant for the City of Bellevue.

Date of Issuance of this Draft EIS

April 6, 2023

Public Comment and Hearing on Draft EIS:

This Draft EIS will be available for a 30-day public comment period. Agencies, affected tribes, and members of the public are invited to comment on the Draft EIS. Comments must be received or postmarked by **May 8, 2023.** Comments can be submitted online, via email, mail, or orally at the public hearing.

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Online:
https://www.engagingbellevue.com/lake-washington-line

Due Date of Draft EIS Comments

Comments on the Draft EIS are invited and must be postmarked or emailed on or before midnight on May 8, 2023. Comments must be addressed to the SEPA Responsible Official noted above.

Date of Draft EIS Public Hearing

A virtual public meeting on the Management Plan and a public hearing on the Draft EIS will be held Tuesday, April 18, 2023 from 5:00 to 6:00 p.m. https://us02web.zoom.us/webinar/register/WN_qDsbKptMRyyIRXROKbvuFw. Attendees may sign up in advance or at the meeting to provide verbal comments during the meeting. The meeting will be recorded and transcribed, and responses to the comments will be provided in the Final EIS.

The purpose of the public hearing is to provide an opportunity for individuals, agencies, and organizations to review information presented in the Draft EIS and to present oral or written comments on the Draft EIS.

Document Availability

The Draft EIS and additional background materials are available for viewing online and can be downloaded from the City's website at https://bellevuewa.gov/city-government/departments/utilities/utilities-projects-plans-standards/capital-projects/lake-washington-line.

Selection of a Preferred Alternative

The City of Bellevue and the Management Plan team is reviewing information about the lake line system to develop strategies for future repair, replacement, or maintenance for the six defined Service Areas in the Plan area. Some sections may not require work; others will require repair, replacement, or maintenance. The City will use the Lake Washington Wastewater Lake Line Management Plan to identify long-term operational and capital improvement strategies for the future repair, replacement, and maintenance of the existing sewer line located underwater or on land adjacent to Lake Washington. In combination with the identification of the preferred alternative (In-Water, Onshore, or Upland Alternative) for future repair and replacement of the aging system, further evaluation and analysis will be performed to determine the best-suited construction method(s) at individual location(s) to implement the operational and capital improvement strategies. Improvements at the pump stations will be evaluated in each Service Area as part of the alternative selection process. The City will select the alternative(s) to be implemented based on several evaluation factors such as environmental, regulatory, social, technical, and cost. Different alternatives may be selected depending on the Service Area.

The City will continue to solicit input on the Plan from the public and other interested parties, during and following the Draft EIS comment period. Identification of preferred alternatives is expected to occur following release of the Final EIS in late 2023.

Timing of Additional Environmental Review

The analysis presented in this EIS is programmatic in nature. The EIS has been prepared to disclose probable significant adverse impacts associated with implementation of the Management Plan to repair, replace, and/or maintain the aging Lake Washington wastewater system. As individual improvements are identified, site-specific environmental review will be conducted prior to implementation. Depending on the preferred alternative selected in each Service Area and

the amount of time needed to obtain regulatory approval of the Management Plan, some projects and actions may be ready for site-specific environmental review starting in 2024.

Potential Required Approvals or Permits

Because alternatives and construction methods have not been selected for any improvements, it is not possible to present a complete list of approvals and permits that would be required for future improvements. It is possible to identify the most common types of approvals and permits that would generally be required for the types of improvements presented in the Management Plan.

Potential approvals and permits are listed below by jurisdictional agency.

- Federal
  - Section 10 or Section 404 permit – U.S. Army Corps of Engineers (Corps)
  - Regional General Permits (RGP) or the Nationwide Permit (NWP) Program – Corps (Dredged Material Management Office [DMMO])
  - Endangered Species Act consultation – National Marine Fisheries Service and/or U.S. Fish and Wildlife Service
- State
  - National Pollutant Discharge Elimination System (NPDES) construction stormwater general permit -- Washington State Department of Ecology (Ecology)
  - Section 401 water quality certification – Ecology
  - Shoreline conditional use permit, or variance – Ecology
  - Hydraulic Project Approval (HPA) – Washington Department of Fish and Wildlife (WDFW)
  - Section 106 National Historic Preservation Act – Department of Archaeology and Historic Preservation (DAHP)
  - Executive Order 05-05 Consultation – DAHP
  - Open Water Disposal Site Use Authorization -- Washington State Department of Natural Resources (WDNR)
- Local Jurisdictions
  - State Environmental Policy Act (SEPA) compliance
  - Environmentally Critical Areas Review/Approval
  - Land Use Permit
  - Shoreline Permit(s)
  - Building and Related Permit(s)
  - Clearing and Grading Permit(s)
  - Right-Of-Way Use Permit(s)
  - Street Use Permit(s)

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List of Acronyms and Abbreviations

AC	asbestos cement
ADA	Americans with Disabilities Act
AP	Analytic Period
BACT	Best Available Control Technology
BAVMC	Beaux Arts Village Municipal Code
BCC	City of Bellevue Land Use Code
BMPs	best management practices
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIP	Capital Improvement Plan
CIPP	cured-in-place pipe
City	City of Bellevue
Corps	U.S. Army Corps of Engineers
CSWPPP	Construction Stormwater Pollution Prevention Plan
DAHP	Department of Archaeology and Historic Preservation
dB	decibel(s)
dBA	A-weighted decibels
DMMO	Dredged Material Management Office
DO	dissolved oxygen
DU	dwelling unit
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FHWA	Federal Highway Administration
FMO	foraging, migration, and overwintering
FMR	fire-modified rock
FOG	fats, oils, and grease
FR	Federal Register
GIS	geographic information system
GMA	Growth Management Act
HGL	hydraulic grade line
HPA	Hydraulic Project Approval
I&I	infiltration and inflow

I-90	Interstate 90
IDP	Inadvertent Discovery Plan
IPaC	Information for Planning and Consultation
KCC	King County Code
L_{eq}	equivalent continuous sound pressure level
LUC	Land Use Code
LWWLL	Lake Washington Wastewater Lake Line
MMC	Medina Municipal Code
MUTCD	Manual on Uniform Traffic Control Devices
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTUs	Nephelometric turbidity units
NWP	Nationwide Permit
O&M	operations and maintenance
OHWM	ordinary high water mark
PHS	Priority Habitats and Species
PM	particulate matter
PM_{10}	particles below 10 microns in diameter
$PM_{2.5}$	fine particles below 2.5 microns in diameter
PS	Pump Station
PSCAA	Puget Sound Clean Air Agency
PSE	Puget Sound Energy
RCW	Revised Code of Washington
RGP	Regional General Permit
RPZ	Residential Parking Zone
RUL	remaining useful life
SCADA	supervisory control and data acquisition
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Office
SMA	Shoreline Management Act
SMP	Shoreline Master Program
SOP	Standard Operating Procedure
SPR	spiral-wound pipe
sq ft	square feet
SR	State Route
TESC	Temporary Erosion and Sediment Control
TMDL	Total Maximum Daily Load

USFWS	U.S. Fish and Wildlife Service
UT	ultrasonic thickness
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WHR	Washington Heritage Register
WISAARD	Washington Information System for Architectural and Archeological Records Data
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WTD	Wastewater Treatment Division
YPMC	Yarrow Point Municipal Code

CHAPTER 1
Introduction & Summary

The City of Bellevue has lake lines in both Lake Washington and Lake Sammamish that are an important part of Bellevue Utilities' wastewater system. The Lake Washington Wastewater Lake Line (LWWLL) system includes 14.6 miles of sewer lines that are either underwater or on land adjacent to Lake Washington, as well as 15 pump stations and eight flush stations. The Lake Sammamish lake lines are not part of this evaluation.

Most of the Lake Washington lake lines were constructed in the 1950s and 1960s to prevent raw sewage from being discharged directly into the lake. Today, this infrastructure serves more than 1,000 community members in Bellevue, Beaux Arts, Medina, Hunts Point, Yarrow Point, and unincorporated King County and still plays a crucial role in keeping Lake Washington water clean. However, the pipes and pump/flush stations that constitute the lake line system are aging, and their location creates challenges for repair and replacement. Without advance planning, components of the lake line system will begin to fail, potentially causing a loss of sewer service to residents and risk to the sensitive lake environment. Line failures could result in property damage to individual homes and widespread contamination of Lake Washington.

Bellevue Utilities is developing a Management Plan for the repair, replacement, and maintenance of the aging lake line system. The **Lake Washington Wastewater Lake Line Management Plan** (the Management Plan, or the Plan) will develop and document a long-term approach for the rehabilitation or replacement of the lake lines, including financial and policy components, to guide future capital improvements to the system. The Management Plan will help ensure the City can continue to provide safe and reliable sewer service to the community, protect public health, and support the Lake Washington ecosystem, while responsibly addressing risks and challenges for the City and residents. It is expected that improvements will be recommended for the near term (0 to 10 years), intermediate term (10 to 20 years), and long term (more than 20 years). As part of this process, the City is preparing a non-project, or "programmatic" environmental impact statement (EIS). This programmatic EIS evaluates the environmental impacts associated with the following four alternatives to replacement and repair of the lake line system as identified in the Management Plan. Alternative details and potential construction methods are further described in Chapter 2, *Description of the Lake Washington Wastewater Lake Line Management Plan* and *Alternatives*.

1. **In-Water Alternative** – Any permanent system improvements to conveyance system infrastructure (the system of force main pipes, intakes pipes, emergency overflows, and all other components used to collect and move sewage to the treatment plant) would be generally located below the ordinary high water of Lake Washington.

2. **On-Shore Alternative** – Any permanent system improvements to conveyance system infrastructure would be generally located between the residences, parks, commercial properties and/or public spaces, and the ordinary high water of Lake Washington.
3. **Upland Alternative** – Any permanent system improvements to conveyance system infrastructure would be generally located upland of the residences, park, commercial property and/or public space, and/or within the general vicinity of the public right-of-way.
4. **No Action Alternative** – Required by the State Environmental Policy Act (SEPA) – Potential implementation methods include continued wastewater system operational strategies and maintenance of existing infrastructure, cleaning and condition assessments and monitoring, piecemeal repair and replacement (projects one-by-one as needed), emergency actions, and actions that are taken to maintain or limit degradation of the existing system. Strategies and actions would address immediate needs, but would not address long-term degradation of the existing system in a holistic manner.

Note that different areas of the lake line system may have different selected alternatives – multiple alternatives could eventually be selected for the entire Lake Washington wastewater lake line system. Alternative(s) implementation will occur over different time horizons. The alternatives are described in more detail in Chapter 2.

1.1 What are the objectives of the Management Plan?

The Lake Washington Wastewater Lake Line Management Plan will identify operational and capital improvement strategies to provide a responsible and effective, long-term approach to maintaining operation of the lake line system. Specifically, the Plan will achieve the following objectives:

- Provide a reliable level of service for existing customers for peak flows while minimizing backups or overflows.
- Maintain, rehabilitate, or replace the lake line system infrastructure with system(s) that are reliable, durable, and maintainable while minimizing risk to the environment.
- Minimize new obligations on the homeowner for infrastructure maintenance and minimize impacts on private property.
- Develop operational strategies that can be implemented in a timely fashion to maintain or improve the quality of the existing system without raising the rates to existing customers outside of typical market levels.

1.2 What is a non-project EIS?

SEPA requires agencies to consider the likely environmental consequences of governmental decisions, including decisions on the adoption of plans, policies, or programs, pursuant to Chapter 43.21C Revised Code of Washington [RCW] and the SEPA Rules (Chapter 197-11 Washington Administrative Code [WAC]). The SEPA Rules provide detail for the environmental review process, including the EIS process.

A non-project EIS is being prepared because the Management Plan is not a specific project, but rather a series of potential future improvement strategies to proactively manage the lake line

system. A non-project EIS, also known as a programmatic EIS, is prepared for planning decisions that provide the basis for later proposed improvement review (WAC 197-11-704). Non-project actions are governmental actions involving decisions on policies, plans, or programs that provide requirements for how the environment can be modified, in this case, standards around how proposed solutions to address the aging lake line system can modify Lake Washington and the surrounding environment, or standards that will govern a series of connected actions through implementation of the Management Plan. Non-project review allows consideration of the "big picture" and will form the basis for subsequent improvement-specific review. The EIS examines the broad plan-level issues related to the general location of alternatives and how combinations of improvements may collectively impact the environment. A non-project EIS differs from a "project-specific" EIS in that it does not focus on specific projects or project locations, design details, or precise footprints of project(s).

1.3 How were the potential impacts of the proposed Lake Washington Wastewater Lake Line Management Plan evaluated?

To evaluate impacts at a programmatic level, certain construction characteristics were used to compare the potential for impacts among the three Action Alternatives (i.e., In-Water, On-Shore, and Upland Alternatives), which could involve larger, more complex construction activities than the No Action Alternative. For the purposes of the impacts analyses (Chapter 4), the various construction approaches (i.e., gravity sewer line, vacuum sewer, pipe bursting) were categorized as either open cut construction methods or trenchless construction methods to evaluate the potential impacts on a programmatic level for each potential Action Alternative (see Section 2.6). If the potential impacts from any of the construction methods varied with the Action Alternative, the construction method impacts were reviewed independently for each element of the environment. Improvements to associated system pump stations were also considered as part of each alternative.

Construction impacts were primarily identified based on the following items for each Action Alternative.

- Excavation Quantities. Improvement components requiring a substantial amount of earthwork (excavation) could affect earth, air quality, surface water, traffic, and cultural resources.
- Surface Disturbance. The larger the surface disturbance area of an improvement, the greater the potential for impacts to environmental resources discussed in this EIS.
- Duration. Improvement construction ranges in length from a few months to 2 years in any given location. The longer the duration of construction, the greater the potential for impacts to most of the resources considered in this EIS.

Impacts on environmental resources are documented as either **significant** or **less-than-significant**; significant adverse impacts for most of the resources refers to impacts that are potentially inconsistent with regulatory standards and/or permit requirements that may require extensive mitigation measures or situations that could not be mitigated.

Similar to the potential construction impacts analyses, operational impacts were evaluated at a programmatic level for operation and maintenance of the improvements. Operational impacts were analyzed for the Action Alternatives and No Action Alternative.

1.3.1 What impacts and mitigation measures did we identify?

Impacts

The impacts analyses accounted for open cut construction methods requiring more surface disturbance for a longer duration than trenchless construction methods. Surface and infrastructure disturbance would generally be more extensive with the Upland Alternative based on the adjacency to residences, parks, commercial properties and/or public spaces, and the location public right-of-way. As such, construction impacts on environmental resources, including but not limited to, land use, earth and soils, plants and animals, transportation, and cultural resources, would be more extensive and occur over extended periods of time with open cut construction methods under the Upland Alternative than the other Action Alternatives due to the additional excavation, larger equipment and required construction time. Similarly, based on the location of the In-Water Alternative in Lake Washington, construction impacts on surface water resources and fish and aquatic resources would be more prominent than the other Action Alternatives and the No Action Alternative. **Table 1-1** summarizes the identified potential construction and operation impacts, as well as presents an overview of most potential measures that the City could take to reduce or minimize potential impacts associated with the Action Alternatives and No Action Alternative. Potential impacts are described in more detail in Chapter 4, *Impacts*.

Mitigation Measures

Mitigation would primarily be guided by local, state, and federal approvals and permits that would generally be required for the types of improvements presented in the Management Plan (potential individual approvals and permits are listed in the EIS Fact Sheet). Additional solutions and mitigation for impacts could include, but are not limited to, the following (summarized in Table 1-1): avoid private properties to the extent practicable while siting improvements, isolate construction work areas, construct in-water improvements during prescribed in-water work windows for fish protection, comply with existing policies and procedures, pro-active coordination with potentially affected utilities and property owners, and adhere to permit conditions. Mitigation measures are described in more detail in Chapter 5, *Mitigation Measures*.

TABLE 1-1
POTENTIAL IMPACTS AND MITIGATION MEASURES BY ENVIRONMENTAL RESOURCE

Resource	Potential Impacts	Potential Significant Impacts	Potential Mitigation Measures
Land Use and Visual Quality	Acquisition of Property and Easements, Incompatibility with Surrounding Land Uses, Conflicts with Existing Plans and Policies, Changes to Views, Light and Glare	• Action Alternatives – If private property acquisition is necessary.	• Restore disturbed areas. • Maintain access to properties and businesses during construction. • When siting potential new facilities, prioritize in public property and rights-of-way. • Comply with existing land use policy. • Follow federal, state, and local real estate transaction and property management process regulations, where appropriate.
Earth and Soils	Erosion, Slope Failure, Unsuitable or Excess Soils, Dewatering and Spoils Disposal	• No Action Alternative – Risk of system failure, substantial contamination, and geologic risk possible.	• Geologic risk assessment and design improvements to minimize geologic hazards. • Erosion control measures. • Appropriate soils disposal and monitoring of settlement during dewatering.
Air Quality and Odors	Dust, Odors, and Emissions	Not Expected	• Construction specifications and measures to control dust. • Reduce vehicle emissions, idling, and travel distances, and encourage carpooling for employees. • Design facilities to control odors and emissions with regular maintenance.
Surface Water Resources	Stormwater and Runoff, Turbidity, Release of Pollutants from Construction Equipment, and Sediments	• Action Alternatives – Risk of system failure releasing untreated wastewater could affect water quality. • No Action Alternative – Highest potential risk (out of all the alternatives) of system failure releasing untreated wastewater that could affect water quality.	• Isolate work areas from open water during dewatering. • Implement erosion and sediment control measures. • Use appropriate plans for monitoring and construction activities. • Implement pollution control measures and waste handling measures. • Decontaminate equipment and restore cleared areas. • Isolate the work area to prevent spillage of construction materials and have spill response materials on-site. • Where possible, use non-petroleum based solvents and fluids and fuel construction equipment 50 feet or more from surface waterbodies.
Fish and Aquatic Resources	Potential Noise in and Near Lake Washington and its Tributaries In-Water Alternative – Could Disrupt Fish Species, especially with Open Cut Construction	• No Action Alternative (Construction) – Risk of habitat alterations from emergency repairs and turbidity and dissolved oxygen if in-water work occurs outside of in-water work windows for fish species. • No Action Alternative (Operational) – Risk of large untreated wastewater release.	• Isolate in-water work area. • Work during prescribed in-water work windows for fish protection. • Install anchor logs for habitat complexity and bioengineered shoreline stabilization. • Install a layer of fish mix gravels in areas impacted by open cut construction. • Restore/enhance disturbed riparian vegetation in on-shore and upland areas.

Resource	Potential Impacts	Potential Significant Impacts	Potential Mitigation Measures
Plants and Animals	Increased Noise and Human Disturbance in Construction Areas	• Action Alternatives (Operational) – If clearing of large areas occurs without complying with land use and shoreline regulations	• Avoid breeding and rearing periods of the sensitive species, if necessary. • Follow permit conditions for construction site runoff. • Retain site vegetation and revegetate. • Comply with National Bald Eagle Management Guidelines. • Implement invasive species control and management.
Noise	Noise Generated by Construction Equipment and Activities, Increased Noise Levels in Residential Areas and near Sensitive Receptors	Not Expected	• Encourage noise-reducing measures. • Work within permitted hours and noise levels to reduce nuisance to adjacent residents, adhere to applicable noise regulations. • Use noise-reducing equipment on construction equipment. • Comply with noise levels specified in facility design.
Transportation	Construction Truck Trips and Barge Use, Construction Employee Commute Trips, Road Closures and Associated Traffic, Transit, Non-Motorized Impacts, and Parking Impacts	Not Expected	• Coordinate with transportation services, local neighborhoods, property owners (where appropriate), school districts, and departments to minimize disruption with advance notice. • Develop a Traffic Control Plan for work within the right-of-way. • Avoid construction routes at congested intersections. • Maintain access for private roads and pedestrian and bicycles or detours, as applicable. • Provide off-street parking at staging areas for construction vehicles and on-site loading areas for material delivery and removal. • Provide ridesharing for construction workers, as possible. • Provide traffic detour plans and post standard construction warning signs in advance of construction areas. • Provide access for emergency vehicles at all times. • Repair or restore the roadway right-of-way to its original condition or better. • Perform an evaluation(s) for feasibility of dock construction to support the barge, if necessary.
Cultural Resources	Risk of Encountering Archaeological or Cultural Resources; Temporary Visual and/or Auditory Impacts on Historic Built Environmental Resources	• On-Shore Alternative, Upland Alternative, and Pump Station Improvements (Construction) – Likelihood to encounter and/or disturb cultural resources.	• Develop and implement an Inadvertent Discovery Plan (IDP), as appropriate. • Develop an Archaeological Monitoring Plan and conduct on-site observation of excavations by an archaeologist, if determined appropriate. • Potential additional coordination with the State Historic Preservation Office (SHPO), and any Affected Tribes.

Resource	Potential Impacts	Potential Significant Impacts	Potential Mitigation Measures
Public Utilities	Disruption of Existing Above- and Below-ground Utilities during Construction	• Action Alternatives - Risk of system failure and loss of service and sewer backups. • No Action Alternative – Risk of system failure could cause sewer overflows and interrupt service to customers.	• Coordinate and determine potential conflicts with other utilities and transportation departments to plan for shared construction and to avoid consecutive construction projects (road construction and other underground utilities). • Develop construction sequence plans and coordinate schedules to minimize service disruptions and provide ample advance notice if service disruption is unavoidable. • Utilize temporary pumping to continue service to LWWLL customers, if needed. • Conduct utility locates prior to ground-disturbing activities.

1.3.2 What is the difference between the alternatives?

The difference between the alternatives is primarily related to their implementation location, the technical feasibility of construction methods with each alternative (further detail is provided in Section 2.6), and the location of the associated facilities (i.e., pump and flush stations). The alternatives identified and evaluated in this EIS and their primary differences are described below:

- **In-Water Alternative** – Improvements would generally be located below the ordinary high water mark (OHWM) of Lake Washington; system infrastructure would either be relocated in-water or replaced in-water (see **Figure 1-1**). Potential construction methods include gravity sewer line via open cut construction or trenchless technology, cured in-place pipe, spiral wound pipe, slip lining, pipe bursting, or emerging technologies. Potential impacts would be primarily associated with the in-water environment and adjacent environmental resources.
- **On-Shore Alternative –** Improvements generally located between the residences, parks, commercial properties and/or public spaces, and OHWM of Lake Washington (see **Figure 1-2**). Potential construction methods include gravity sewer line via open cut construction or trenchless technology, or vacuum sewers. Potential impacts would be primarily concentrated on the on-shore area and associated human and environmental resources; however, construction could affect the aquatic environment.
- **Upland Alternative** – Improvements generally located upland of the residences, park, commercial property and/or public space, and/or within the general vicinity of the public right-of-way (see **Figure 1-3**). The pump and flush stations connected to the lake line system are also located in the upland area. Potential construction methods include gravity sewer line via open cut construction or trenchless technology, vacuum sewers, or grinder pumps. Potential impacts would primarily be concentrated on the upland area and associated human and environmental resources.
- **No Action Alternative** – Continuation of existing operational strategies and maintenance of existing infrastructure in place. Methods could include cleaning and condition assessments and monitoring, piecemeal repair and replacement (projects one-by-one), emergency actions, and actions that are taken to maintain or limit short-term degradation. Potential impacts would be concentrated where the existing system is located and could potentially affect the adjacent environmental resources.

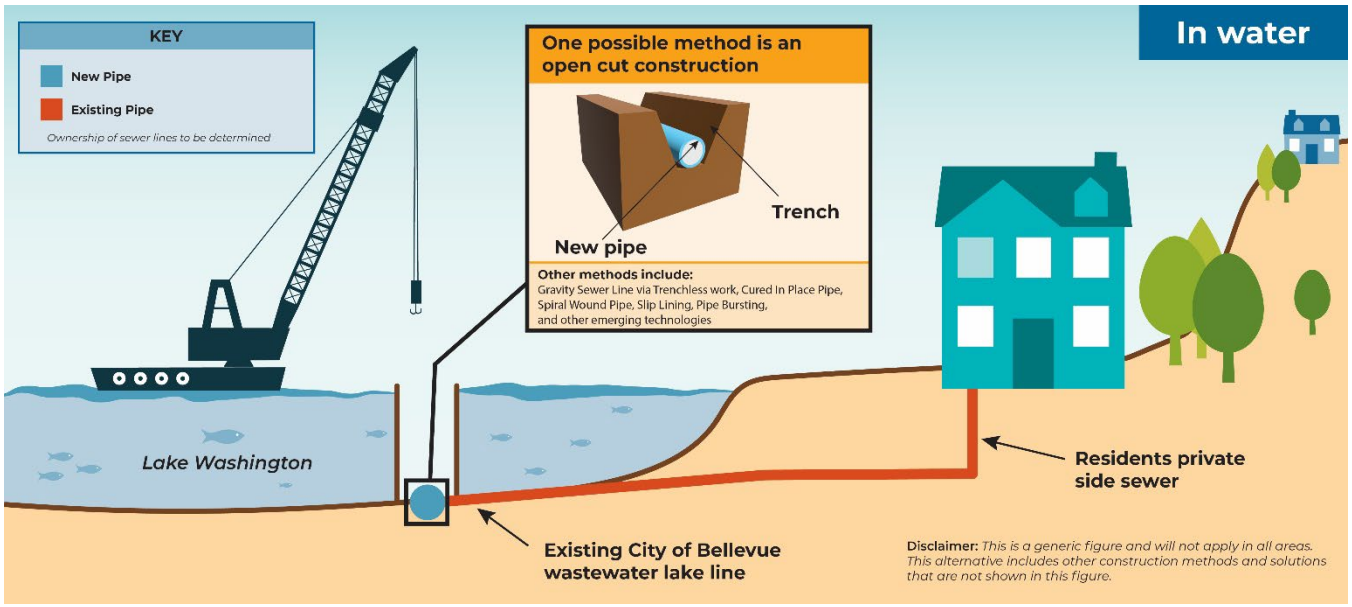


Figure 1-1
In-Water Alternative

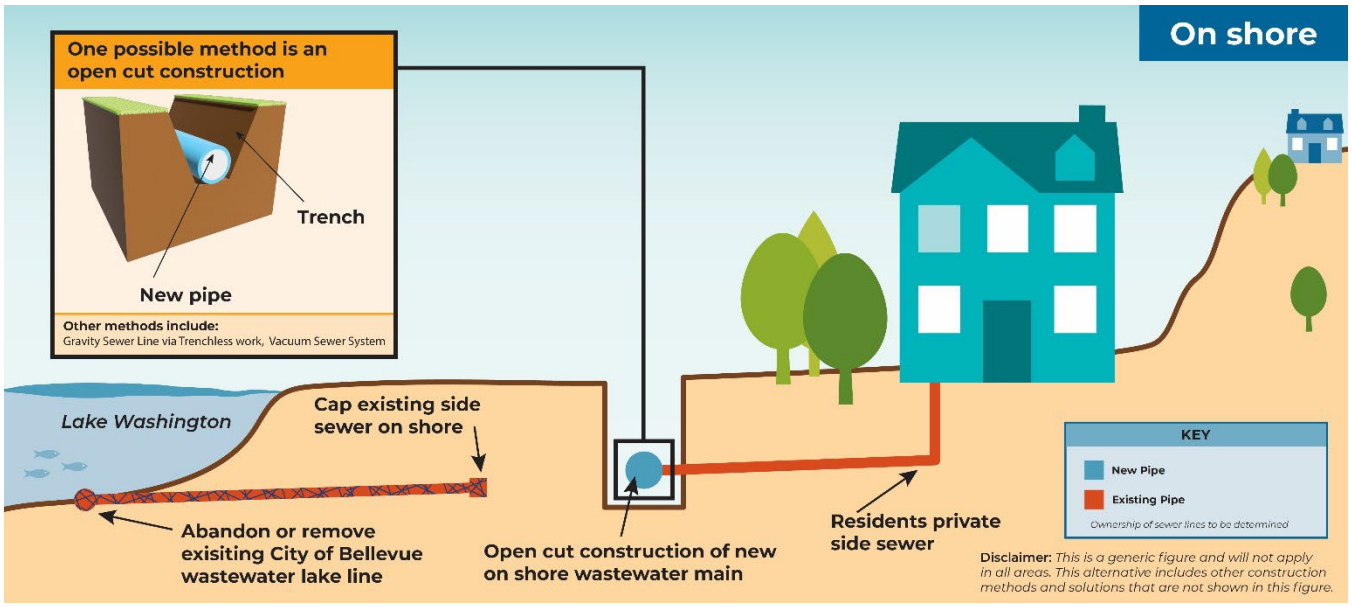


Figure 1-2
On-Shore Alternative

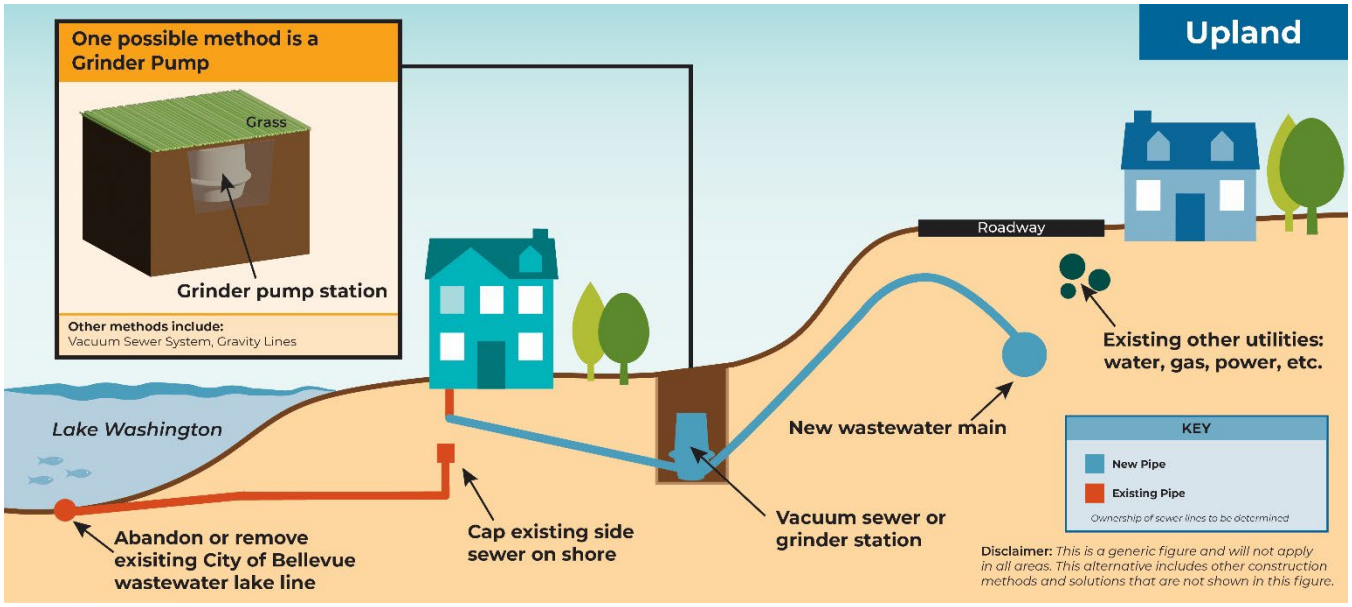


Figure 1-3
Upland Alternative

1.4 Are there any potential unavoidable adverse impacts?

SEPA defines significant impact as "*a reasonable likelihood of more than a moderate adverse impact on environmental quality*" (WAC 197-11-794). Summarized below are the potential significant unavoidable adverse impacts associated with the Action Alternatives and the No Action Alternative. Refer to Chapter 6, *Significant Unavoidable Adverse Impacts*, for further discussion.

- **Land and Shoreline Use** – Since most of the Lake Washington shoreline is developed for residential use, direct or indirect impacts on the adjacent properties and aquatic habitat during any construction of wastewater system improvements are likely unavoidable. To the extent possible, the City would avoid private property acquisition and displacement of residents or businesses if property is needed for a new facility (e.g., pump station). Significant unavoidable adverse impacts would occur if acquisition of private property or displacement of residents or businesses were required to implement the Plan.
- **Earth Resources** – The No Action Alternative could result in significant impacts on the earth and soils of the Plan area in the future, as the system continues to age, should a system failure occur. The frequency and likelihood of failure of the system as it ages would also increase. Undetected leaks over an extended period could contaminate adjacent soils and increase the potential for erosion.
- **Surface Water Resources** – Although the Management Plan Action Alternatives would reduce the risk of surface water contamination by updating the aging system, the risk of system failure cannot be completely eliminated by any of the alternatives. If a system failure occurred in or near Lake Washington and its tributaries, it would impact water quality by releasing untreated wastewater, which could degrade water quality, impact fish habitat, and create a public health and safety hazard by releasing bacterial and chemical pollutants. The

risk of system failure cannot be eliminated and is considered a significant impact. The frequency, likelihood, and potential impact of failure is higher with the No Action Alternative than with any of the Action Alternatives due to the age and condition of the existing system.

- **Fish and Aquatic Resources** – Habitat alterations from emergency repairs, along with turbidity and dissolved oxygen impacts associated with emergency repairs under the No Action Alternative, have the potential to have significant impacts on fish and aquatic resources if unplanned in-water repairs occur outside of the in-water work windows for fish species.
- **Public Utilities** – Impacts from system failure could result in a loss of service for some customers and sewer backups. Although the likelihood of a system failure is low, no mitigation measures could completely eliminate the possibility of an incident or the resulting impacts. Therefore, the result of system failure is considered a significant adverse impact on public utilities. While this impact is present with all alternatives, the No Action Alternative poses a higher risk of failure than any of the Action Alternatives.

1.5 What are the cumulative impacts of the Management Plan?

Cumulative impacts are the effects that may result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (40 Code of Federal Regulations [CFR] 1508.7). *"Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time"* (40 CFR 1508.7). Plan elements could be constructed in areas that may have recently been subject to other construction projects or will be subject to construction of future planned projects. The cumulative impacts associated with the Management Plan relate largely to construction of the Action Alternatives.

The Management Plan will potentially result in cumulative impacts associated with extended construction impacts from Plan improvements that would require long-term construction and may overlap with other construction activities in the Plan area. Long-term construction could contribute to surface water impacts from ongoing runoff based on the location of the existing infrastructure. Proper construction best management practices (BMPs) to control runoff would be implemented.

The long-term effects of construction-related impacts can negatively affect residents, businesses, and those who access or travel to the area, resulting in impacts that range from temporary inconvenience to construction fatigue on residents, businesses, and recreational activities.

Transportation capital projects and neighborhood projects may occur concurrently within the Plan area. Due to the potential extended timeframe of Plan implementation, many major ongoing projects in the Plan area are expected to be completed by the time some of the Plan improvements will be built.

The primary construction impacts related to improvements from the Action Alternatives would include traffic and slowdowns, increased dust and emissions, and construction noise. Many neighborhoods, residents, and workers may experience ongoing construction noise and traffic delays for years from unrelated construction efforts. "Construction fatigue" could be worse in

neighborhoods that have seen a high level of construction for other projects in recent years or that would experience extended construction times. Impacts from construction could be offset by deferring construction in areas where construction has occurred under other Plan improvements. To the greatest extent practicable, the City would try to schedule construction projects to minimize neighborhood impacts and reduce overall construction-related impacts in affected communities. The City will coordinate closely with the proponents of major projects to minimize the potential for cumulative impacts; however, some level of cumulative impact is likely unavoidable. As appropriate, the City will develop site-specific mitigation during the review period for each individual improvement.

The Action Alternative improvements would have long-term benefits to the environment and customers by providing a more reliable level of service and extending the life of the lake line system while minimizing risk to the environment. After construction, the lake line system would be less likely to fail and able to be maintained more efficiently, resulting in a lower risk of environmental contamination from system failures. In addition to protecting water quality in Lake Washington, this would reduce the potential for human health risks associated with potential system failure and provide benefits to existing customers. Cumulative impacts are not expected from the No Action Alternative; however, the No Action Alternative has the highest probability of minor or major system failure out of all the alternatives, which would threaten environmental conditions.

1.6 What are the areas of concern?

The Lake Washington lake line pipes are deteriorating in many places and are known to be partially filled with debris in places. Without implementation of improvements, potential pipe failures could result in economic, environmental, and social costs, threatening sensitive shoreline habitat, closing beaches, and interrupting wastewater service to homeowners. As with all major infrastructure improvements and construction, there will be difficult decisions and areas of concern associated with implementation of the Plan. Improvements to extend the useful life of the lake line system will require a significant commitment of funding to construct major infrastructure projects or programs. Concerned parties will likely have questions about the Management Plan regarding funding and prioritization of projects, tradeoffs, and coordination with other projects that may take place concurrently. The timing of strategy or improvement implementation is a potential concern, and a wide range of viewpoints can be expected.

Timing of the construction of system improvements under the In-Water Alternative would also be restricted by the Washington Department of Fish and Wildlife (WDFW) and U.S. Army Corps of Engineers (Corps) established in-water work windows in Lake Washington for fish species. Additionally, construction of system improvements in a highly developed mostly residential setting where limited undeveloped land is available will result in difficult siting decisions that could require short-term or permanent impacts on existing land uses, including the potential for impacts on parks or recreational facilities, private property, or community facilities. These challenging siting decisions will be present particularly in the On-Shore and Upland Alternatives.

Construction-related traffic impacts will be of considerable concern to affected residents and business owners. Some neighborhoods in the Service Areas have been the location of previous major construction projects and may experience additional construction-related impacts as part of implemented alternatives. The City will follow its policies regarding the siting of wastewater system infrastructure and facilities, which give preference for City-owned or other public property and rights-of-way, but there will likely be concern if private sites are identified.

1.7 How has the public been involved with the development of the Management Plan and the EIS?

Public engagement is an important part of both the Management Plan and SEPA processes. The City has a Lake Washington Lake Line Management Plan website (https://bellevuewa.gov/city-government/departments/utilities/utilities-projects-plans-standards/capital-projects/lake-washington-line), where they solicited comments to the Plan via an online survey, email, and phone number.

Consistent with SEPA, the City collected EIS scoping comments through a Lake Washington Sewer Line EIS Online Open House extending from July 11 to August 5, 2022, a virtual public scoping meeting on Tuesday, July 26, and via email. Notices about the Management Plan and public scoping were also sent out via mail, via social media posts, and on posters that were distributed in designated locations. By the close of the scoping period, the City had received six different comments—two comments were submitted via the Engaging Bellevue comment portal, and four comments were submitted via email. Comments were summarized in a final Scoping Report that identified the major topics and themes contained in the comments, and the scoping summary was posted to the City's website. See **Appendix A** for the Scoping Report.

Bellevue Utilities also hosted an online open house on the EngagingBellevue.com platform. The online open house was live from Monday, July 11, to Wednesday, August 31, extending longer than the scoping period. The online open house shared information about the Lake Washington Lake line system, why a management plan and EIS are needed, and potential alternatives for the aging lake lines.

Public comments are invited on this Draft EIS, and an EIS Online Public Meeting is scheduled to receive comments on the Draft EIS. All public comments received during the Draft EIS comment period will be considered and addressed in the Final EIS.

1.8 Future Project-Level Analyses

The Management Plan will provide a framework for the City to evaluate options for the repair and/or replacement of segments of the Lake Washington wastewater lake line system. As described in Section 1.2, this non-project EIS is being prepared to provide a basis for later review of improvements and assist in the selection of future improvements based on the Management Plan. The improvement selection decision and evaluation of future improvements will be facilitated by providing this environmental analysis as part of the non-project EIS process. The

selection of future improvements will be informed by the analysis of potential environmental impacts from implementing the Management Plan alternatives evaluated in the EIS and be tailored to the best improvement at a specific location based on the unique location constraints. Additionally, the future improvement-level environmental analyses can incorporate and expand on the environmental issues identified during the non-project stage for each specific location and improvement type. The results of this non-project EIS will inform future improvement decisions and minimize unforeseen constraints as improvements proceed to the permitting and implementation stage.

Future project-level analyses will occur after the completion of the Management Plan. No new specific capital improvements or projects are planned or proposed to be constructed as a result of adoption of the Plan; however, the purpose of the Plan is to inform and guide the identification, selection, timing, and implementation of future capital improvement projects. Future repair, replacement, or maintenance activities of the wastewater lake line and associated facilities will require separate project-level environmental review. The future project-level review(s) will inform decision-makers about site-specific, project-level environmental impacts and mitigation.

CHAPTER 2

Description of the Lake Washington Wastewater Lake Line Management Plan and Alternatives

2.1 Location

A portion of the Lake Washington wastewater lake line system is owned and operated by the City of Bellevue, serving customers in multiple jurisdictions. The portions managed by the City of Bellevue are located along the shoreline of Lake Washington within the following areas (see **Figure 2-1**):

- Bellevue
- Beaux Arts
- Medina
- Hunts Point
- Yarrow Point
- King County (unincorporated)

2.2 Overview of the Existing Wastewater Lake Line System

The lake line system includes approximately 14.6 miles of lake lines along the Lake Washington shoreline with 15 pump stations and eight flush stations. The lake lines are sewer pipes that follow the shoreline of Lake Washington underwater and in some cases on land adjacent to the lake. Approximately 9 miles of these pipelines are cast iron, 3 miles are asbestos cement, and 1 mile is unknown and miscellaneous material types. Most of the lake line system was constructed in the 1950s and 1960s. Wastewater enters the lake line through City-owned collectors, pump stations, and numerous private lateral side-sewers that discharge directly to the lake line.

The lake line system relies on pump and flush stations to convey wastewater to the gravity system or King County Wastewater Treatment Division (WTD) regional conveyance system. The City's lake line pump and flush stations are commonly located on the waterfront and on private properties, often resulting in difficult access. Pump and flush stations convey flows through the lake lines and then discharge flow in the upland sewer system.

Sources: System Infrastructure: Carollo Engineers 2022; City Boundaries: WADNR 2022

Bellevue Lake Line EIS

Figure 2-1
Lake Washington Lake Line System Location

In 2016, a preliminary condition assessment showed varying degrees of aging in the lake line pipes and interior pipe linings (Tetra Tech,2016). The current system is an operational challenge, primarily because the system is located under a sensitive lake environment, and in many cases, maintenance access is only available through private property. The flat pipe slopes that have resulted from settlement and changes in the lakebed over time and the lack of pipe access for regular cleaning operations in a sensitive lake environment have made operational maintenance of the current system a challenge. The lake line system pipes are aging in many places, and some locations are known to be partially filled with debris. Since some sewer rehabilitation alternatives require a clean host pipe, cleaning of these lake lines in the future is a priority (if it can be done without risking further damage to aging pipes) if certain rehabilitation alternatives are to be considered. If the pipeline is kept in the same alignment as it is now, these constraints will continue to hinder future operations and maintenance (O&M). Additionally, components of the lake line system will begin to fail, and without advance planning could cause a loss of service to residents and extensive risk to the water quality and the sensitive lake environment.

2.2.1 Components of the Lake Line System

Lake line systems require multiple components to function. An overview of the Lake Washington sewer lake line system is shown in Figure 2-1 and system components are summarized below.

- **Flush Stations** – Flush stations that use lake water to "flush" – or assist the movement of sewage – through the lake line. Flush stations are typically run at least once per day on a set schedule, often overnight when sewer flows are lowest to maximize flushing effectiveness.
- **Pump Station (PS)** – Pump stations are used to convey flows from and through the lake line systems and then discharge flow into the upland sewer system.
- **Lake Lines** – Wastewater conveyance pipelines buried near the shoreline in Lake Washington or in some cases on the shoreline. In the 1990s and early 2000s, several capital improvement plan projects placed rock over the most vulnerable locations. The lake lines have unique and complex hydraulics that require different operation from the City's gravity collection mains and force mains.
- **Lake Line Cleanouts and Maintenance Holes** – Access points to lake lines within Lake Washington that are largely only accessible by boat.
- **Force Mains** – Pressurized pipelines conveying wastewater from pump stations to upland sewer systems.
- **Recirculation Maintenance Holes** – Specialized maintenance holes that protect low-lying customers by limiting the pressure in the lake lines. Once the downstream operating capacity of the lake line is reached, the recirculation returns excess flows to the pump station, rather than forcing additional flow at a higher pressure that may cause backups to low-lying customers downstream.
- **Customer Lateral Side-Sewers** – Pipes that connect from the private customer homes and business lines on land to the Lake Washington lake lines. A portion of lateral side-sewers (5 feet) are located within the City's sewer easement and are maintained by the City. Many lateral side-sewers serve more than one customer.
- **Gravity Mains** – Publicly owned gravity pipelines conveying wastewater throughout the system. A limited number of gravity mains convey upland flow into the lake lines in Lake Washington.

Figure 2-2 provides a schematic of the operation and function of a typical lake line system. Typical operations are shown on the figure:

- Flows from customers enter the lake line via customer lateral side-sewers and gravity sewers.
- Sustained high flows cause higher pressures in the lake line. These flows may be from a combination of upstream flush and pump stations and infiltration and inflow (I&I) from customer lateral side-sewers and gravity sewers. The pressure is based on the elevation of the recirculation pipe within the recirculation structure and set in relation to the hydraulic gradient data charts. Once the highest pressure/flow is achieved in the lake line, the recirculation back to the wet well will cause the station to overflow due to capacity along with overcoming pumping capacity. See description of recirculation maintenance holes below.
- Recirculation maintenance holes return flow to wet wells to maintain lower lake line pressure. The pressure regulation that occurs is set by the physical open end of pipe elevation of the recirculation pipe within the recirculation maintenance hole.
- At most stations, very high wet well levels caused by excessive inflows are relieved by an overflow to Lake Washington.

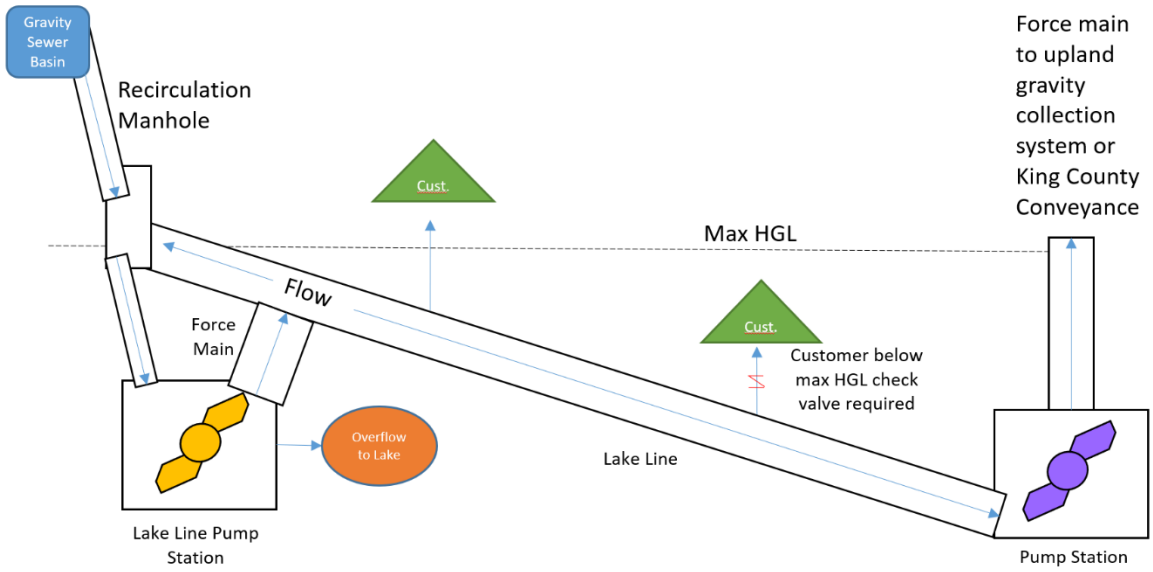


Figure 2-2
Typical Lake Line System Operation

*HGL = Hydraulic grade line

2.3 Planning Context

Without advance planning, components of the lake line will begin to fail, potentially causing a loss of service to residents and risk to the sensitive lake environment. Bellevue Utilities is developing the **Lake Washington Wastewater Lake Line Management Plan** (the Plan) to guide the repair, replacement, and maintenance of the lake line system. The Plan will ensure the City can continue to provide safe and reliable sewer service to the community and protect public health and the sensitive Lake Washington ecosystem.

The Management Plan documents a long-term approach to rehabilitation or replacement of the lake line and connected pump and flush stations. The Plan consists of eight major elements, including Introduction, Existing System, Operational Strategies, Policy Considerations, Service Area Plans, Financial Plan, Hydraulic Model, and Geographic Information System (GIS) Database.

2.4 How were the Service Areas developed?

The lake line system has been divided into six "Service Areas" for analysis and planning. The Management Plan team is reviewing information about the lake line system to develop strategies for future repair, replacement, or maintenance in these Service Areas. Some sections may not require work; others will require repair, replacement, or maintenance.

The Service Areas were developed based on sections of the lake line with similar characteristics. A Service Area includes all attributes of the lake line system such as the lake line pipe, pump/flush stations, recirculation maintenance holes, cleanouts and lateral side-sewers, as well as the characteristics of the basin such as parcels/customers, topography and land cover, zoning, critical areas, docks, and bulkheads. Service Areas are used for efficiency or interdependencies of hydraulic function, construction sequencing/methodology, and permitting.

2.4.1 Overview of the Service Areas

The locations of the six Service Areas dividing the Lake Washington sewer lake line system are shown in **Figure 2-3;** the length and pump stations in each Service Area are listed in **Table 2-1**, followed by a description of each Service Area from north to south.

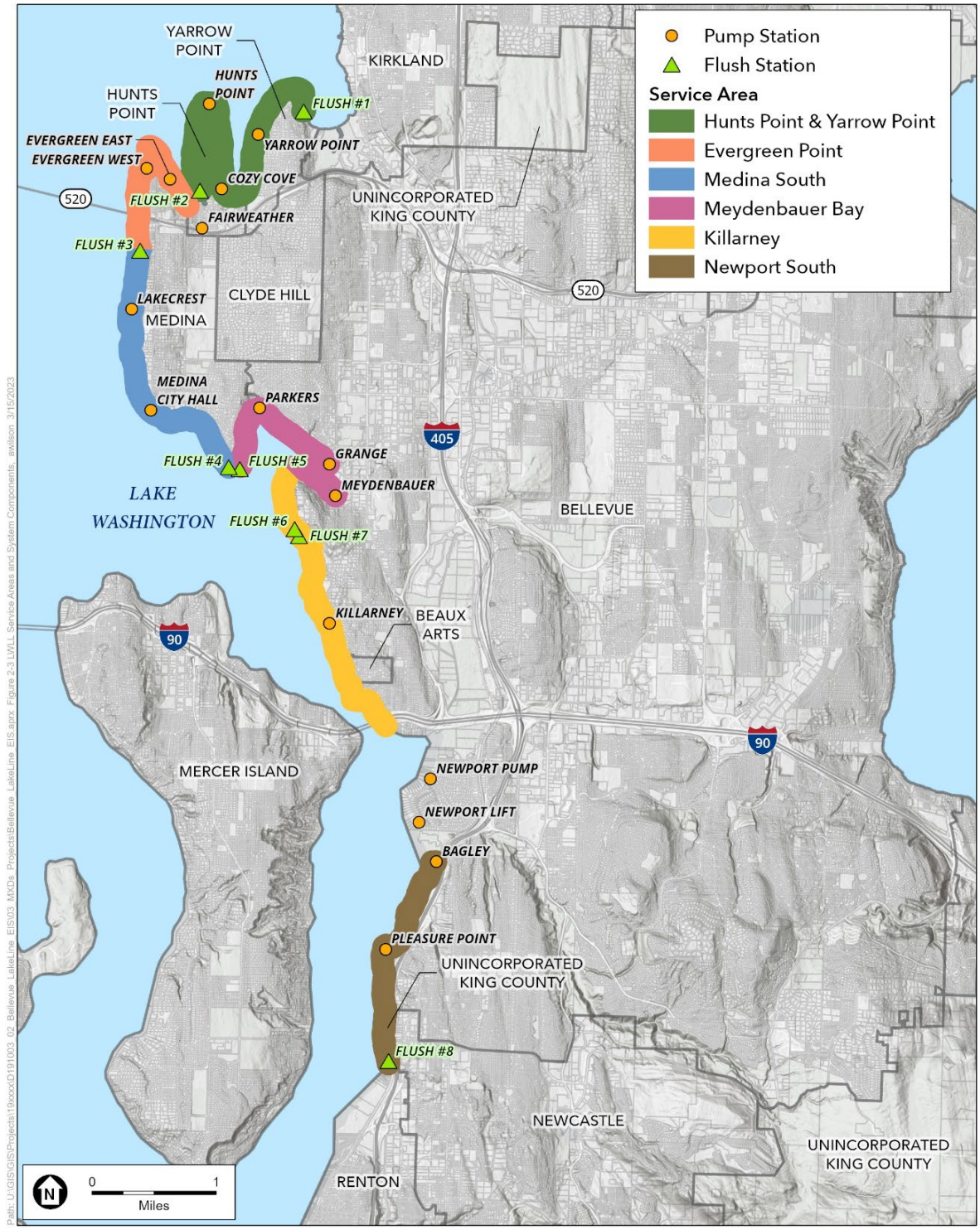
Portions of the shoreline of the Service Areas contain infrastructure to address erosion, including bulkheads. According to a 2001 study, 70 percent of Lake Washington's shoreline was armored with concrete, riprap, sheet pile, or another type of bulkhead (City of Seattle 2013).

TABLE 2-1
SERVICE AREA LENGTH AND STATIONS

Service Area	Approximate Pipe Length (Linear Feet)[1]	Approximate Parcels Served[1]	Pump and Flush Stations
Hunts Point and Yarrow Point	16,755	587	Flush Station #1 Yarrow Point Pump Station Cozy Cove Pump Station Hunts Point Pump Station Flush Station #2
Evergreen Point	8,423	172	Evergreen East Pump Station Evergreen West Pump Station Fairweather Pump Station Flush Station #3*
Medina South	12,320	213	Flush Station #3* Lakecrest Pump Station Medina City Hall Pump Station Flush Station #4
Meydenbauer Bay	11,212	448	Flush Station #5 Parkers Pump Station Grange Pump Station Meydenbauer Pump Station
Killarney	10,835	336	Flush Station #6 Flush Station #7 Killarney Pump Station*
Newport South	10,175	149	Killarney Pump Station* Pleasure Point Pump Station Bagley Pump Station Flush Station #8

* Note that Flush Station #3 and the Killarney Pump Station are at the Service Area boundaries and are necessary for the operation of the lake line system in both areas.

[1] Numbers are approximated based on the best available GIS information and are not confirmed by survey information.



Sources: System Infrastructure: Carollo Engineers 2022; City Boundaries: WADNR 2022; Parcels: King County 2022

Bellevue Lake Line EIS

Figure 2-3
Lake Washington Lake Line Service Areas and System Components

Hunts Point and Yarrow Point Service Area

The Hunts Point and Yarrow Point Service Area (approximately 3.2 miles of lake line) covers the entirety of the lake line system in the cities of Hunts Point and Yarrow Point, including a portion of Yarrow Bay and Cozy Cove Bay, and fully encompasses the peninsula of Hunts Point. The Hunts Point and Yarrow Point Service Area spans from approximately 0.15 mile north of Morningside Park following the Lake Washington lake line system to incorporate the system in Hunts Point, ending where Fairweather Bay intersects the peninsula containing Fairweather Place roadway.

The Hunts Point and Yarrow Point Service Area serves approximately 587 parcels, which are zoned primarily as residential and contain approximately 154 private docks with interspersed bulkhead infrastructure. The existing zoning in the Hunts Point portion of the Hunts Point and Yarrow Point Service Area is single-family residential on lots ranging from 20,000 to 40,000 square feet (sq ft) (R20 and R40) and public use or town park property (Town of Hunts Point 2007 Zoning Map). Similarly, in the Yarrow Point section, the zoning is Public Uses and single-family residential (R-15). The public use zoning is composed of Road End Beach Park and the Wetherill Nature Preserve (Town of Yarrow Point 2015 Comprehensive Plan).

The Service Area is primarily low-intensity development land cover with some medium intensity developed areas and sparse evergreen and deciduous areas and woody wetlands in Wetherill Nature Preserve. All of the shoreline of the Service Areas is located within a moderate to high liquefaction hazard area. The Hunts Point and Yarrow Point Service Area also contains the following critical areas: a landslide deposit at the northernmost point of Yarrow Point adjacent to Lake Washington, and some steep slopes on the east side of Yarrow Point (see Section 3.2).

Evergreen Point Service Area

The Evergreen Point Service Area (approximately 1.6 miles of lake line) covers a small portion of Hunts Point and the western side of the Fairweather Bay peninsula north of State Route (SR)-520; spans the lake line system into the City of Medina, Evergreen Point, and the portion of the system that intersects SR-520 perpendicularly; and ends approximately 0.4 mile south of SR-520.

The Evergreen Point Service Area serves approximately 172 parcels where the existing zoning is primarily single-family residential and parks and public places, including Lake Lane Park and Fairweather Nature Preserve and Park (Town of Hunts Point 2007 Zoning Map and City of Medina 2018 Official Zoning Map). There are approximately 72 private docks along the shoreline and a City of Medina dock at Lake Lane Park. The land cover in the Service Area is primarily open space and low-intensity development with medium to high-intensity development for SR-520 and interspersed forest cover. The shoreline of the Evergreen Point Service Area is within a moderate to high liquefaction hazard area and contains a small landslide deposit along the shoreline north of NE 24th Street.

Medina South Service Area

The Medina South Service Area (approximately 2.3 miles of lake line) encompasses most of the lake line system in the City of Medina, beginning at the southern terminus of the Evergreen Point

Service Area south of SR-520, and extends along the shoreline of Lake Washington following the lake line system to the edge of Groat Point at Meydenbauer Bay and covering about half of the Groat Point peninsula inland.

The Medina South Service Area serves approximately 213 parcels and is zoned primarily as single-family residential and parks and public places, including Medina Beach Park and Viewpoint Park (City of Medina 2018 Official Zoning Map). There are approximately 75 private docks along the shoreline and a City of Medina dock at Viewpoint Park at 84th Avenue NE. The land cover in the Service Area is partially evergreen forest and open space development with areas of low to medium intensity development in the southern portion. The shoreline of the Medina South Service Area is within a moderate to high liquefaction hazard area and also contains the following critical areas: interspersed areas of landslide deposits west of Evergreen Point Road near 73rd Avenue NE and steep slopes along Lake Washington for the span of Evergreen Point Road.

Meydenbauer Bay Service Area

The Meydenbauer Bay Service Area (approximately 2.1 miles of lane line) covers the eastern portion of Groat Point, the lake line system along Meydenbauer Bay and Whalers Cove, and ends approximately where SE Shoreland Drive turns south as it intersects SE Shoreland Place. The Meydenbauer Bay Service Area is located partially in the City of Medina to the west and transitions into the City of Bellevue on the east approximately where Overlake Drive E meets Lake Washington Boulevard NE.

The Meydenbauer Bay Service Area serves approximately 448 parcels, which are zoned primarily as residential, specifically single-family residential in the City of Medina and single- and multi-family residential in the City of Bellevue and contains approximately 92 private docks (City of Medina 2018 Official Zoning Map and City of Bellevue 2015 Comprehensive Plan). Clyde Beach Park and Meydenbauer Bay Beach Park are located in the residential zoned areas as a land use compatible with the low residential density. The land cover in the Service Area is mostly low and medium density with higher intensity development near Downtown Bellevue and interspersed forested areas. The shoreline of the Meydenbauer Bay Service Area is also located within a moderate to high liquefaction hazard area and areas of landslide deposits along Overlake Drive E and SE Shoreland Drive, with steep slopes east of Overlake Drive E and adjacent to SE Shoreland Drive.

Killarney Service Area

The Killarney Service Area (approximately 2.1 miles of lake line) begins at the terminus of the Meydenbauer Bay Service Area south along the lake line system in the City of Bellevue, encompasses the lake line system in Beaux Arts Village, and extends approximately 0.2 mile south of Interstate 90 (I-90).

The Killarney Service Area is zoned primarily as single-family residential and public parks and public spaces, including Chism Beach Park, Burrows Landing Park, Chesterfield Beach Park, and Enatai Beach Park within Bellevue; it serves approximately 336 parcels and contains

approximately 93 private docks (City of Bellevue 2015 Comprehensive Plan and Town of Beaux Arts Village 2015 Comprehensive Plan). The portion of the Service Area in Beaux Arts Village along the shoreline is designated as open space and as single-family residential farther inland.

The land cover in the northern portion of the Service Area is a mix of open space, low-intensity development, evergreen and deciduous forested areas, and evergreen forest along the shore in Beaux Arts Village, with higher intensity development in the southern section near the I-90 bridge. The shoreline of the Killarney Service Area is located within a moderate to high liquefaction hazard area and contains the following critical areas: landslide deposits west of 94th Avenue SE and at Chism Beach Park, the southern section of the Service Area is atop Seattle Fault Zone, which puts the area at risk for shallow crustal earthquake and surface rupture and steep slopes along most of the shoreline.

Newport South Service Area

The northern terminus of the Newport South Service Area (approximately 1.9 miles of lake line) is approximately 1.5 miles south of the southern terminus of the Killarney Service Area. The connecting pipeline between the Killarney Service area and the Newport South Service is located upland (the pipeline is not located in the lake in this segment). Beginning at the southern portion of Newcastle Beach Park, the Newport South Service Area extends following the lake line system in the southern portion of the City of Bellevue into unincorporated King County, parallels I-405 to the east, and ends approximately 500 feet north of the Virginia Mason Athletic Center in Renton.

The Newport South Service Area serves approximately 149 parcels and within Bellevue is zoned as single-family residential and in King County as residential, with 6 dwelling units per acre (R-6) and contains approximately 98 private docks (City of Bellevue 2015 Comprehensive Plan and King County 2018 iMap). The land cover in the Service Area is mostly low to medium intensity development, which includes the I-405 roadway with some open space developed areas. Similar to the other Service Areas, the shoreline of the Newport South Service Area is also located within a moderate to high liquefaction hazard area, and contains the following critical areas: landslide deposits along Lake Washington Boulevard SE and Hazelwood Lane SE, location atop the Seattle Fault Zone putting area at risk for shallow crustal earthquake and surface rupture, and steep slopes adjacent to I-405.

2.5 EIS Alternatives

The City is considering four different alternatives in the Management Plan. Potential solutions could take place in the lake, on land, and on individual properties. It is important to note that different areas of the system will have different selected alternatives. There will not be one alternative selected for the entire lake line.

Consistent with SEPA, the non-project EIS also evaluates the No Action Alternative, which describes what would occur if the Management Plan Action Alternatives are not implemented and includes potential operational strategies. Development of the Management Plan is also part of the

No Action Alternative by identifying strategies for operation and maintenance to consider if the Action Alternatives are not fully implemented.

2.5.1 In-Water Alternative

With the In-Water Alternative, any permanent system improvements to infrastructure would be generally located below the OHWM of Lake Washington (refer to Figure 1-1 for depiction). Depending on system components and conditions, system infrastructure would be relocated in-water or replaced in-water. If an in-water pipeline is decommissioned, the decommissioning would comply with permit conditions, but the pipeline segment would likely be emptied, capped at both ends, and left in place to minimize the risk of contamination or future issues. Removal of the pipeline segment would likely cause more disturbance to the lakebed to remove it than leaving it in place.

Various pipeline replacement technologies and rehabilitation approaches could be used. Implementation methods may include: gravity sewer line via open cut construction, gravity sewer line via trenchless construction, trenchless rehabilitation (cured-in-place pipe [CIPP], spiral-wound pipe [SPR], slip lining, pipe bursting, emerging technologies), new or retrofitted pump/flush stations, and associated improvements. Existing pump/flush stations are located on-shore, and new pump flush stations would be sited either on-shore or in upland areas.

2.5.2 On-Shore Alternative

In the On-Shore Alternative, any permanent system improvements to infrastructure would be generally located between the residence, park, commercial property and/or public space, and the OHWM of Lake Washington. Depending on system components and conditions, system infrastructure would be relocated or replaced on-shore (refer to Figure 1-2 for depiction).

Implementation methods may include: gravity sewer line via open cut construction, gravity sewer line via trenchless construction, a vacuum sewer system, as well as new or retrofitted pump/flush stations and associated improvements. Many of the existing stations have been recommended for upgrades, but verification of flows to each station will be conducted if flows to the station are altered because of improvements to other portions of the lake line.

2.5.3 Upland Alternative

In the Upland Alternative, any permanent system improvements to infrastructure would be generally located upland of the residence, park, commercial property and/or public space, and within the general vicinity of the public right-of-way. Depending on system components and conditions, system infrastructure would be relocated or replaced in the upland area (refer to Figure 1-3 for depiction).

Implementation methods may include: gravity sewer line via open cut or trenchless construction, grinder pump system, vacuum sewer system, new or retrofitted pump/flush stations, and associated improvements. Grinder pump systems and vacuum valve chambers would be located below ground. These components would vary depending on how many houses are connected to the lateral side-sewer line and which type of system is used. In general, the grinder pumps and

vacuum valves are roughly 2 to 3 feet in diameter. See Section 2.6 below for a description of these methods.

Associated Facilities

Improvements to associated system pump and flush stations are also considered as part of each alternative. Improvement options range from replacement or upgrade of individual components, significant upgrades (i.e., adding odor control; major repairs that do not require replacement of the structure itself), or complete replacement of the pump/flush station structure. Impact analyses for pump and flush station improvement options are included in Chapter 4, along with the EIS alternatives impact analyses per environmental resource topic.

2.5.4 No Action Alternative

SEPA requires that an EIS "*present a comparison of the environmental impacts of the reasonable alternatives and include the no action alternative*" (WAC 197-11-440 (5)(vi)). The No Action Alternative provides an understanding of what would occur if the Management Plan is not fully implemented. For this EIS, the No Action Alternative is defined as implementation of the same types of operation and maintenance activities that have occurred in the past and that are likely to continue into the future. The No Action Alternative would have no capital improvements.

The operation and maintenance of pump stations and flush stations and associated system infrastructure would continue in the existing locations as before. Maintenance would occur as incremental and uncoordinated repairs and replacements, and the system would not function optimally. The system components will eventually fail after extending the life where feasible by conducting emergency repairs, cleaning, and condition assessments, which could result in system failures and wastewater overflows.

Operational strategies are actions that are taken to maintain or limit degradation of the existing infrastructure. Methods may include review of operations procedures, cleaning and inspection, access improvements (maintenance hole, cleanout installation), data collection, and emergency repairs. They can also include tasks for planning or preparing for capital improvements.

The current and ongoing operational strategies are described below in Section 2.7.1 and 2.7.2.

2.6 Potential Construction Methods for Capital Improvement Strategies

Construction methods would be analyzed for future improvements for feasibility and applicability under each Management Plan Action Alternative, in combination with an evaluation of other factors (as described in Section 2.8), to determine the best strategy or strategies to implement for each Service Area. For the purposes of the impact analyses (Chapter 4), the construction approaches (i.e., gravity sewer line, vacuum sewer, pipe bursting) were categorized as either open cut construction methods or trenchless construction methods to evaluate the potential impacts on a programmatic level for each potential Action Alternative (see **Table 2-2)**. The alternative and construction methods selection process will consider and weigh the impact analysis, evaluation

factors, and location constraints to determine the best construction method at any given location. More details on the evaluation factors, such as environmental, regulatory, social, technical, and cost, are included in Section 2.8. Various construction methods are described in **Appendix B.**

TABLE 2-2
ACTION ALTERNATIVES AND CONSTRUCTION APPROACHES AND METHODS

Alternative	Construction Method	Construction Approach
In-Water	Open Cut	Gravity Sewer Line via Open Cut Construction
	Trenchless	Gravity Sewer Line via Trenchless Technology
	Trenchless	Cured In-place Pipe (CIP)
	Trenchless	Spiral Wound Pipe (SPR)
	Trenchless	Slip Lining
	Trenchless	Pipe Bursting
	Trenchless	Emerging Technologies
On-Shore	Open Cut	Gravity Sewer Line via Open Cut Construction
	Open Cut	Vacuum Sewers
	Trenchless	Gravity Sewer Line via Trenchless Technology
Upland	Open Cut / Trenchless	Gravity Sewer Line via Open Cut Construction
	Trenchless	Gravity Sewer Line via Trenchless Technology
	Open Cut / Trenchless	Grinder Pumps
	Open Cut	Vacuum Sewers

2.7 Operational Strategies and Maintenance Proposed in the Management Plan

Operational strategies are actions that would be taken to maintain or limit degradation of the existing infrastructure. During the decision process for individual improvements on segments of the lake line, operational strategies and maintenance efforts may be used in conjunction with the alternatives identified.

2.7.1 Existing Maintenance

Existing maintenance for the lake line infrastructure is outlined in the 2015 City of Bellevue Wastewater System Plan and includes maintenance on the pipelines, flush and pump stations, and maintenance holes. Regular inspection, condition assessments, and cleaning are scheduled for maintenance holes and pipelines to prevent blockages or structural failure. Existing maintenance based on specific system infrastructure components is summarized below.

- **Pump Stations** – All pump stations are maintained on a monthly schedule. Inspection and wet well maintenance are performed during the first 10 business days of each month, and scheduled repairs and maintenance activities are performed during the remainder of the month. Routine minor repairs and cleaning and lubrication of pumps, controls, and pumping

equipment are performed at each visit. Wet wells are hosed down until sludge and debris are discharged.

- **Flush Station** – Similar to pump station maintenance, flush stations are checked monthly to see that pumps, motors, dehumidifiers, and the 24-hour clock are working properly. The 24-hour clock controls operation of the flush station. Cell phone communication provides remote control of on/off capabilities of the flush stations.
- **Lake Pipelines** – Lake pipelines, classified as special case pipelines, have limited access, complicating preventive maintenance activities. Lake lines are cleaned primarily on an immediate response basis; some lake lines are on a regular cleaning schedule depending on past observed overflows and/or tendency for sedimentation. Cleanouts are opened and visually inspected for grease buildup.
- **Maintenance Holes** – Inspections are part of an ongoing maintenance hole survey program, and maintenance holes near lakes and other critical area buffers are surveyed more frequently. All maintenance holes are visually inspected for structural defects, system problems, and accessibility, with a goal of visually inspecting one-third of the system annually.

Maintenance on the existing wastewater lake line system includes implementation of emergency repair. Damage to wastewater system components could lead to spills of sewage or the inability of the treatment plant to process waste, allowing it to flow untreated into the local environment. Emergency repair activities are separate from planned repair and existing maintenance planning. Because of the immediate nature of emergencies, the repair options available are limited and focus on reducing the threat to the proper performance of essential wastewater system functions and services. The consequences associated with emergency repairs may be higher than typical maintenance operations since repair options would be limited and the required constrained timeframe.

2.7.2 Operational Strategies

Several actions can be taken to limit degradation of existing infrastructure as the Management Plan is being implemented. Operational strategies specific to the lake line system are categorized as follows and described in **Table 2-3**:

- Operations Procedure Review
- Cleaning and Inspection
- Access Improvements
- Data Collection
- Emergency Repair Planning

TABLE 2-3
OPERATIONAL STRATEGIES

Operational Strategy	Description
Operations Procedure Review	
Review Standard Operating Procedures (SOPs)	• Review the City's catalog of standard operating procedures specific to the lake line. Document and formalize any other routine maintenance tasks completed by staff that are not SOPs. Develop new SOPs where existing procedures are deficient.
Development Review	• Ensure that current standards relevant to the lake line are enforced. This could include permitting and inspection of any new lake line lateral side-sewers, docks, bulkheads, or significant grading activities.
Facility Review	• Develop standard procedures for asset inventories and condition assessments, to uniformly evaluate needed facility improvements.
Cleaning and Inspections	
Cleaning and Inspection	• Continue feasible routine cleaning and inspection of elements critical to lake line function (i.e., removal of debris from flush station and pump intakes, solids removal from pipes, etc.). • Consider purchasing additional or specialized maintenance equipment to expand City's in-house maintenance capabilities. • Evaluate the use of non-traditional cleaning methods (such as ice pigging that uses a two-phase ice and liquid slurry) to prevent further damage to aging pipes. • Inspect existing flush station inlet screens and replace if damaged or missing. • Conduct public outreach to educate customers on the importance of keeping fats, oils, and grease (FOG) out of the sewer system.
Cleanout Modifications	• Continue work to raise cleanouts above lake surface.
Access Improvements	
Lake Line	• Improve future access and ability to locate lake line. This may include installation of vaults under the docks that can isolate a segment and allow bypass to clean between vaults. • Construct additional maintenance holes or access points near known occurrences of debris accumulation. Maintenance holes and vaults should be designed with sumps or other means of debris collection and removal in mind.
Pump and Flush Station Access	• Reduce public access to pump and flush stations by installing fencing or other barriers to reduce risk of damage or injury. • Construct permanent access for necessary maintenance equipment. • Obtain legal access to all pump and flush stations that currently do not have easements or public rights-of-way that supports how it is regularly accessed. • Coordinate with property owners to maintain existing landscaping around existing cleanouts, pump and flush stations to facilitate O&M access.
Data Collection	
Survey	• Confirm pipe size, material, and location of lake line pipe relative to shoreline. Feasibility of capital improvements depends primarily on location due to permitting restrictions and construction method limitations. • Confirm locations of exposed lake line pipe and monitor as storms may move rocks and expose new areas of pipe that could be subject to damage from nearshore activities.
Overflow Monitoring	• Implement a recirculation maintenance hole and pump station overflow monitoring system for recirculation maintenance holes that is linked to the telemetry/SCADA system.
HGL at Cleanouts	• Monitor and log the HGL at cleanouts. This information can be used to identify failures in the lake line system that lead to unusual operating conditions, identify properties at highest risk for overflow damages, and calibration of the lake line system hydraulic model.

Operational Strategy	Description
I&I Evaluation	• Complete I&I evaluation in areas where leaks are suspected (areas experiencing unusual pump/flush station cycling, previous breaks, visible leaks).
Customer Complaints	• Conduct public outreach to educate customers on what type of issues to report, how to reduce risks of damaging the existing infrastructure, and proper complaint channels. Log complaints in a database that is identifiable by location and relationship to lake line system.
Flush/Pump Station Operation	• Monitor the existing operation of flush and pump stations closely for deviations from typical operating conditions that may be indicative of a failure within the lake line system. This may require purchasing and installing additional monitoring equipment. • Install permanent flow meters downstream of pump stations to measure the combined customer and flushing flows.
Lateral Side-sewer Inventory	• Develop a database of existing lateral side-sewers identifying known parameters such as age, pipe material, location, replacement/repair history, and properties served.
Structure Inventory	• Develop a database of existing structures with the potential to damage the existing lake line or City-owned portion of lateral side-sewers (i.e., bulkheads, docks, landscaping features).
Condition Assessment	• Collect additional pipe assessments at locations near previous evaluations to track pipe degradation over time. • Conduct condition assessments of pump and flush stations that do not have a current evaluation. • Perform UT measurement of the pipe wall (or using other emerging pipe assessment technologies) where feasible and as allowed by permitting constraints. Conduct at regular intervals to validate RUL estimates.
Emergency Repair Planning	
Overflow SOP	• Develop plans to respond to overflows of the lake line system. Plan should identify documentation and reporting procedures, mitigation measures, and cleanup standards.
Pipe Failure SOP	• Develop a plan to respond to failures of the lake line pipe based on pipe size, material, condition, and location.

Abbreviations: SOP - standard operating procedure; FOG - fats, oils, and grease; HGL – hydraulic grade line; SCADA - supervisory control and data acquisition; I&I - infiltration and inflow; UT - ultrasonic thickness; RUL - remaining useful life.

2.8 Implementation Approach and Timing

The City will use the Lake Washington Wastewater Lake Line Management Plan to identify long-term operational and capital improvement strategies for the future repair, replacement, and maintenance of the existing sewer line located underwater and on land adjacent to Lake Washington. In combination with the identification of the preferred alternative (In-Water, Onshore, or Upland Alternative) for future repair and replacement of the aging system components, further evaluation and analysis will be performed to determine the best-suited construction method(s) at individual location(s) to implement the operational and capital improvement strategies. Improvements at the pump stations will be evaluated in each Service Area as part of the alternative selection process. The City will select the alternative(s) to be implemented based on several evaluation factors such as environmental, regulatory, social, technical, and cost.

Different alternatives may be selected depending on the Service Area. Evaluation factors that will be considered will include the following factors (refer to **Figure 2-4**).

- **Permitting** – Evaluate the effort required to prepare and obtain the necessary permits from local, state, and federal agencies.
- **Environmental Impact** – Evaluate the extent of the impacts on regulated environmental resources (lake, wetland, stream, or associated buffers) and geologic hazards.
- **Right-of-Way and Easement** – Evaluate the extent to which land use rights would need to be acquired or modified to implement the alternative.
- **Performance, O&M** – Evaluate how the location of the lake line system impacts the ease and feasibility of long-term maintenance.
- **Constructability** – Evaluate the technical feasibility and risk associated with constructing the alternative.
- **Cost** – Evaluate the relative total cost of the alternative, including design, construction, mitigation, permitting, and life cycle.
- **Local Community and Stakeholders** – Evaluate the potential various impacts on or challenges to local residents, community groups and stakeholders.

The Management Plan will include risk-based prioritization and recommended capital and operational improvements of the lake line system that are intended to establish location priorities and guide future capital improvements; however, no specific capital projects are planned or proposed to be constructed as a result of the Management Plan. Recommended improvements are expected to be recommended for the near term (0 to 10 years), intermediate term (10 to 20 years), and long term (more than 20 years).

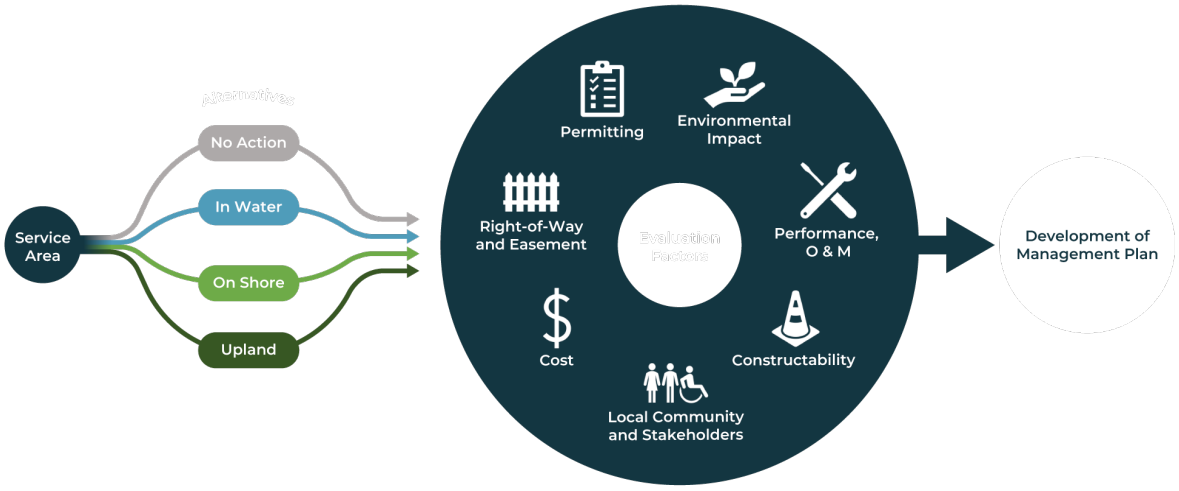


Figure 2-4
Alternatives Evaluation Process

CHAPTER 3
Affected Environment

The LWWLL Management Plan area includes approximately 14 miles of shoreline in the communities of Bellevue, Beaux Arts Village, Medina, Town of Hunts Point, Town of Yarrow Point, and unincorporated King County. This chapter describes the environmental setting for the Plan area, with sections addressing the following elements of the environment: land and shoreline use, plans, and policies; earth resources; air quality and odor; surface water resources; fisheries and aquatic ecosystems; vegetation and wildlife; noise; transportation; cultural resources; and public utilities.

3.1 Land and Shoreline Use, Plans, and Policies

This section describes the existing land and shoreline uses and applicable policies, plans, and regulations for the Plan area and other potentially affected areas.

3.1.1 What is the land use setting of the Plan area?

The Plan area encompasses portions of the following six jurisdictions: Bellevue, Beaux Arts Village, Medina, Town of Hunts Point, Town of Yarrow Point, and King County. The LWWLL Management Plan divides the LWWLL into six Service Areas for analysis: Hunts Point and Yarrow Point, Evergreen Point, Medina South, Meydenbauer Bay, Killarney, and Newport South. **Figure 2-3** depicts these six Service Areas.

3.1.2 What are the visual resources of the Plan area?

The Plan area is located along the shore of Lake Washington. Views of the lake are prominent throughout the area. Views of Seattle, Mercer Island, the Olympics and Mt. Rainier are visible from some portions of the Plan area.

3.1.3 What are the governing land use regulations in the Plan area?

The term “land use” refers to how land is developed for various human uses or preserved for natural purposes. Land use in the Plan area along the shoreline of Lake Washington is dominated by residential development, but also contains natural areas such as parks interspersed throughout.

Comprehensive Planning

Comprehensive planning provides policies that guide the adoption of development regulations and inform policy decisions regarding development. Each of the six jurisdictions within the Plan

area has developed a comprehensive plan that is specific to the jurisdiction. Comprehensive plans provide policies that guide the adoption of development regulations and inform policy decision regarding development.

Zoning and Shoreline Use

The existing zoning and shoreline regulations for each jurisdiction are presented below. The most pertinent regulations and policies related to wastewater utilities in the Plan area are also described.

Zoning

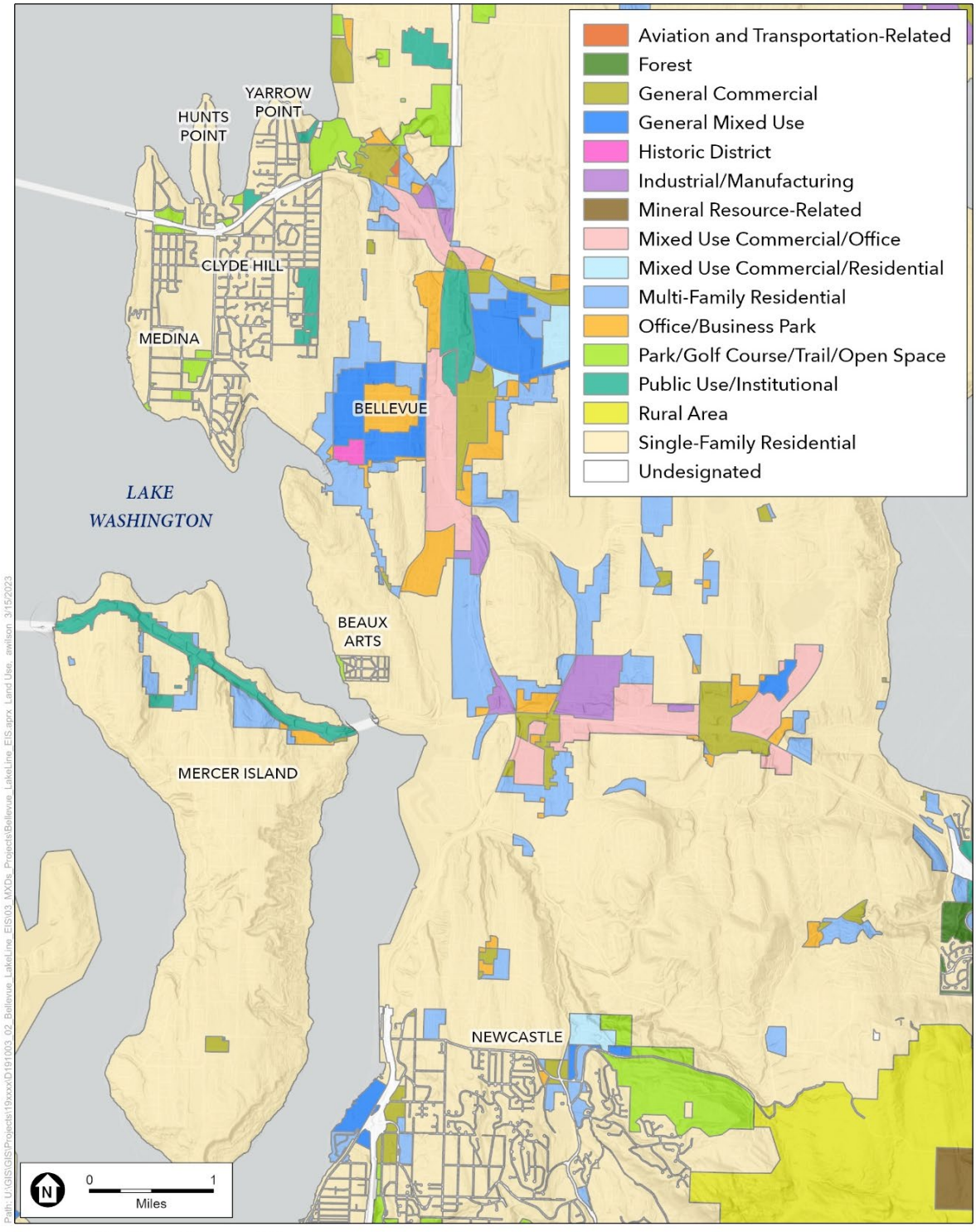
Each of the six jurisdictions has developed their own land use zoning code that regulates the development of public utilities in each zone. Local zoning codes or ordinances implement policies defined in the comprehensive plans. Zoning codes specify development regulations for land use zones (e.g., residential, commercial, manufacturing) as well as address special and/or unclassified land uses and permit requirements and procedures. **Table 3.1-1** describes each lake line Service Area, the communities that the area encompasses, and the existing land use zoning in each area.

The goals and policies most pertinent to the LWWLL are summarized by jurisdiction below in Table 3.1-1. General zoning present in the Plan area is depicted in **Figure 3.1-1**.

TABLE 3.1-1
SUMMARY OF ZONING DESIGNATIONS FOR EACH SERVICE AREA

Lake Line Service Area	Community/Communities served by Lake Washington Lake Lines	Zoning in each Lake Line Service Area
Hunts Point and Yarrow Point	• Hunts Point • Yarrow Point	• R-20 (Single Family Residential), R-40 (Single Family Residential), and R20A Town Park Property • Public Uses and R-15 (Single Family Residential)
Evergreen Point	• Medina	• R-20 (Single Family Residential)
Medina South	• Medina	• R-20 (Single Family Residential), R-30 (Single Family Residential), Public (Parks and Public Spaces), and R-16 (Single Family Residential)
Meydenbauer Bay	• Medina • Bellevue	• R-20 (Single Family Residential) • Single Family and Multi Family
Killarney	• Bellevue • Beaux Arts	• Single Family • Open Space adjacent to Single Family Residential
Newport South	• Bellevue • King County	• Single Family • R-6 (residential, 6 DU per acre)

DU = dwelling unit



Sources: Land Use/Zoning: King County 2023

Bellevue Lake Line EIS

Figure 3.1-1
General Plan Area Land Use

Shoreline Master Planning

Because the Plan area is largely located within the shoreline zone (200 feet) of Lake Washington, the guidelines of each jurisdiction's Shoreline Master Program (SMP) also apply. As defined by the Shoreline Management Act of 1971, shorelines include certain waters of the state plus their associated "shorelands." At a minimum, the waterbodies designated as shorelines of the state are streams whose mean annual flow is 20 cubic feet per second (cfs) or greater and lakes whose area is greater than 20 acres. Shorelands are defined as: "*those lands extending landward for 200 feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward 200 feet from such floodways; and all wetlands and river deltas associated with the streams, lakes, and tidal waters which are subject to the provisions of this chapter…Any county or city may determine that portion of a one-hundred-year-floodplain to be included in its SMP as long as such portion includes, as a minimum, the floodway and the adjacent land extending landward two hundred feet there from…Any city or county may also include in its SMP land necessary for buffers for critical areas"* (RCW 90.58.030).

Bellevue

Land Use and Zoning

The existing land use and zoning along the shoreline of Lake Washington in Bellevue includes single-family and multi-family residential zones (City of Bellevue 2022) (**Figure 3.1-1**).

Shoreline Master Program (SMP)

The City of Bellevue SMP (City of Bellevue 2015) describes the following regarding utility-related policies that may be applicable to the LWWLL:

- **SH-72:** *"Discourage new utility facilities (including underwater pipelines and cables) in the shoreline area and prohibit new utility facilities in the shoreline setback, shoreline wetlands and lands designated as shoreline aquatic except where there is no technically feasible alternative, and where impacts to ecological functions, in both the long-and-short-term, can be adequately mitigated. Priority shall be given to protecting the aquatic resource over the adjacent upland."*
- **SH-73:** *"Encourage consolidation of new utilities within existing rights-of-way or existing utility easements and design and locate new utility facilities to minimize impacts to lands designated as shoreline aquatic, native vegetation, protect scenic shoreline views, and minimize conflicts with present and planned shoreline uses."*
- **SH-75:** *"Allow the replacement of existing utility facilities in the shoreline area, where impacts to ecological functions, in both the long-and-short-term, can be adequately mitigated."*
- **SH-76:** *"Incorporate best management practices into utility maintenance activities to protect shoreline and aquatic resources and regularly review and update practices to ensure best available practices meet or exceed accepted industry standards."*
- **SH-84**: *"Regulate and limit to the greatest extent feasible land disturbing activities within the shoreline jurisdiction to protect the natural topographic, geologic, vegetated, and hydrological features of the landscape and meet federal and state requirements to reduce the discharge of pollutants and protect water quality."*

- **SH-89:** *"Limit fill waterward of the ordinary high water mark to that necessary to support environmental restoration and mitigation, public access, and water-dependent uses located on the shoreline where no feasible alternative exists."*

Town of Beaux Arts Village

Land Use and Zoning

The existing zoning/comprehensive plan designations along the shoreline of Lake Washington in Beaux Arts Village include open space adjacent to Single Family Residential zones (**Figure 3.1-1**) (Town of Beaux Arts 2015).

Shoreline Master Program (SMP)

The Beaux Arts Village SMP (Town of Beaux Arts Village 2014) describes the following regarding utility-related policies that may be applicable to the LWWLL:

Policies

- *"A. Repair, maintenance, replacement, expansion and upgrades to existing primary utilities, including the City of Bellevue's sanitary sewer line and the Town's municipal water or stormwater management systems, should be allowed."*
- *"B. Clearing and grading for the repair, maintenance, replacement, expansions, and upgrades of primary utilities shall be kept to a minimum and, upon project completion, any disturbed area shall be restored as nearly as possible to pre-project conditions, including Beaux Arts Village SMP (July 2014) Page 45 of 45 replanting with native or other appropriate non-invasive species approved by the Town. If the previous condition is identified as being undesirable, then landscaping and other improvements shall be undertaken."*
- *"D. Any new primary utility lines shall be located underground. Existing above-ground lines shall be moved underground when properties are redeveloped or in conjunction with major system upgrades."*

Medina

Land Use and Zoning

The existing zoning designations along the shoreline of Lake Washington in Medina include Single Family Residential (R-16, R-20, and R-30) and Public (Parks and Public Spaces) (**Figure 3.1-1**) (City of Medina 2018).

Shoreline Master Program (SMP)

The City of Medina Municipal Code (MMC) (City of Medina 2022) describes the following regarding utility-related policies that may be applicable to the LWWLL:

16.64.060. - Utilities.

- *"B. All utilities shall comply with the policies and regulations for the specific shoreline environment designation, and the general shoreline regulations in Chapter 16.66 MMC."*
- *"H. Whenever feasible, utility lines, pipes, conduits, cables, meters, vaults, and similar infrastructure and appurtenances shall be placed underground to the maximum extent feasible."*

Hunts Point

Land Use and Zoning

The existing zoning along the shoreline of Lake Washington in Hunts Point includes Single Family Residential (R20 and R40), and Town Park Property (R20A) (**Figure 3.1-1**) (Town of Hunts Point 2007).

Shoreline Master Program (SMP)

The Town of Hunts Point SMP (Hunts Point 2015) describes the following regarding utility-related policies that may be pertinent to the LWWLL:

6.12 Utilities

- *"A. Repair, maintenance, replacement and upgrades to the City of Bellevue's lakeshore sanitary sewer line shall be accomplished with no net loss of ecological function."*
- *"B. In areas where utilities must cross shoreline jurisdiction, they shall do so by the most direct route feasible, unless such a route would negatively impact an environmentally critical area, obstruct public access to the shoreline, or interfere with the navigability of a waterbody regulated by this SMP."*
- *"C. Use of construction methods that avoid greater impact shall be used when feasible, which may include directional boring, use of sleeves or other construction methods which reduce or avoid temporary and long-term adverse ecological impacts."*
- *"F. Clearing for the installation or maintenance of utilities shall be kept to a minimum and, upon project completion, any disturbed area shall be restored as nearly as possible to pre-project conditions, including replanting with native species, or other species as approved by the Town. If the previous condition is identified as being undesirable, then landscaping and other improvements shall be undertaken."*
- *"I. Accessory utilities, such as water, power, or wastewater lines serving a single-family residence, are permitted under the primary use served by the utility. To minimize disturbance in shoreline jurisdiction, and to reduce the impact on shoreline ecological functions, accessory utilities should be co-located within existing or proposed roadway, driveway, and/or parking area corridors that provide access to the development, except when the consolidation of the utilities within those areas will not realize the intended function of the utility or the cost of avoiding disturbance is substantially disproportionate as compared to the environmental impact of proposed disturbance. If co-location is not possible, impacts related to new accessory utility corridors and connections shall be mitigated."*

Yarrow Point

Land Use and Zoning

The existing zoning along the shoreline of Lake Washington in Yarrow Point includes Public Uses and Single Family Residential (R-15) **(Figure 3.1-1**) (Yarrow Point 2017).

Shoreline Master Program (SMP)

The Yarrow Point SMP (Yarrow Point 2017) describes the following regarding utility-related policies, similar to the Hunts Point SMP:

6.13 Utilities

- *"A. Repair, maintenance, replacement and upgrades to the City of Bellevue's lakeshore sanitary sewer line shall be accomplished with no net loss of ecological function."*
- *"B. In areas where utilities must cross shoreline jurisdiction, they shall do so by the most direct route feasible, unless such a route would negatively impact an environmentally critical area, obstruct public access to the shoreline, or interfere with the navigability of a waterbody regulated by this SMP."*
- *"C. Use of construction methods that avoid greater impact shall be used when feasible, which may include directional boring, use of sleeves or other construction methods which reduce or avoid temporary and long-term adverse ecological impacts."*
- *"F. Clearing for the installation or maintenance of utilities shall be kept to a minimum and, upon project completion, any disturbed area shall be restored as nearly as possible to pre-project conditions, including replanting with native species, or other species as approved by the Town. If the previous condition is identified as being undesirable, then landscaping and other improvements shall be undertaken."*
- *"I. Accessory utilities, such as water, power, or wastewater lines serving a single-family residence, are permitted under the primary use served by the utility. To minimize disturbance in shoreline jurisdiction, and to reduce the impact on shoreline ecological functions, accessory utilities should be co-located within existing or proposed roadway, driveway, and/or parking area corridors that provide access to the development, except when the consolidation of the utilities within those areas will not realize the intended function of the utility or the cost of avoiding disturbance is substantially disproportionate as compared to the environmental impact of proposed disturbance. If co-location is not possible, impacts related to new accessory utility corridors and connections shall be mitigated."*

King County

Land Use and Zoning

The existing zoning designation along the shoreline of Lake Washington in King County in the Plan area includes R-6 (residential, 6 DU per acre) (**Figure 3.1-1**) (King County 2018).

Shoreline Master Program (SMP)

The Shoreline section of the King County Comprehensive Plan (King County 2016) describes the following policies regarding utilities:

15. Utilities

- ***"S-760** Utility facilities shall be designed and located to assure no net loss of shoreline ecological processes and functions, preserve the natural landscape, and minimize conflicts with present and planned land and shoreline uses, while meeting the needs of future populations in areas planned to accommodate growth."*
- ***"S-761** King County shall allow modification of existing utility facilities and the location of new water-oriented portions of utility facilities in the shoreline jurisdiction provided that a mitigation sequence is applied (see policy S-616) and there is no net loss of shoreline ecological processes and functions. To the maximum extent practical, those parts of utility production and processing facilities that are not water-oriented, such as power plants and sewage treatment plants, shall be located outside of the shoreline jurisdiction."*

- ***"S-763** Utilities should be located in existing developed rights-of-way and corridors to the maximum extent practical."*
- ***"S-764** Unless no other feasible alternative location exists, King County should discourage:*
  - *a. Locating pipelines and cables in water, on tidelands or roughly parallel to the shoreline; and*
  - *b. The development of facilities that may require periodic maintenance that disrupts shoreline ecological processes and functions."*

  ***"**King County shall ensure that any utility facilities that are allowed do not result in a net loss of shoreline ecological processes and functions or significant adverse impacts to other shoreline resources and values."*

3.2 Earth Resources

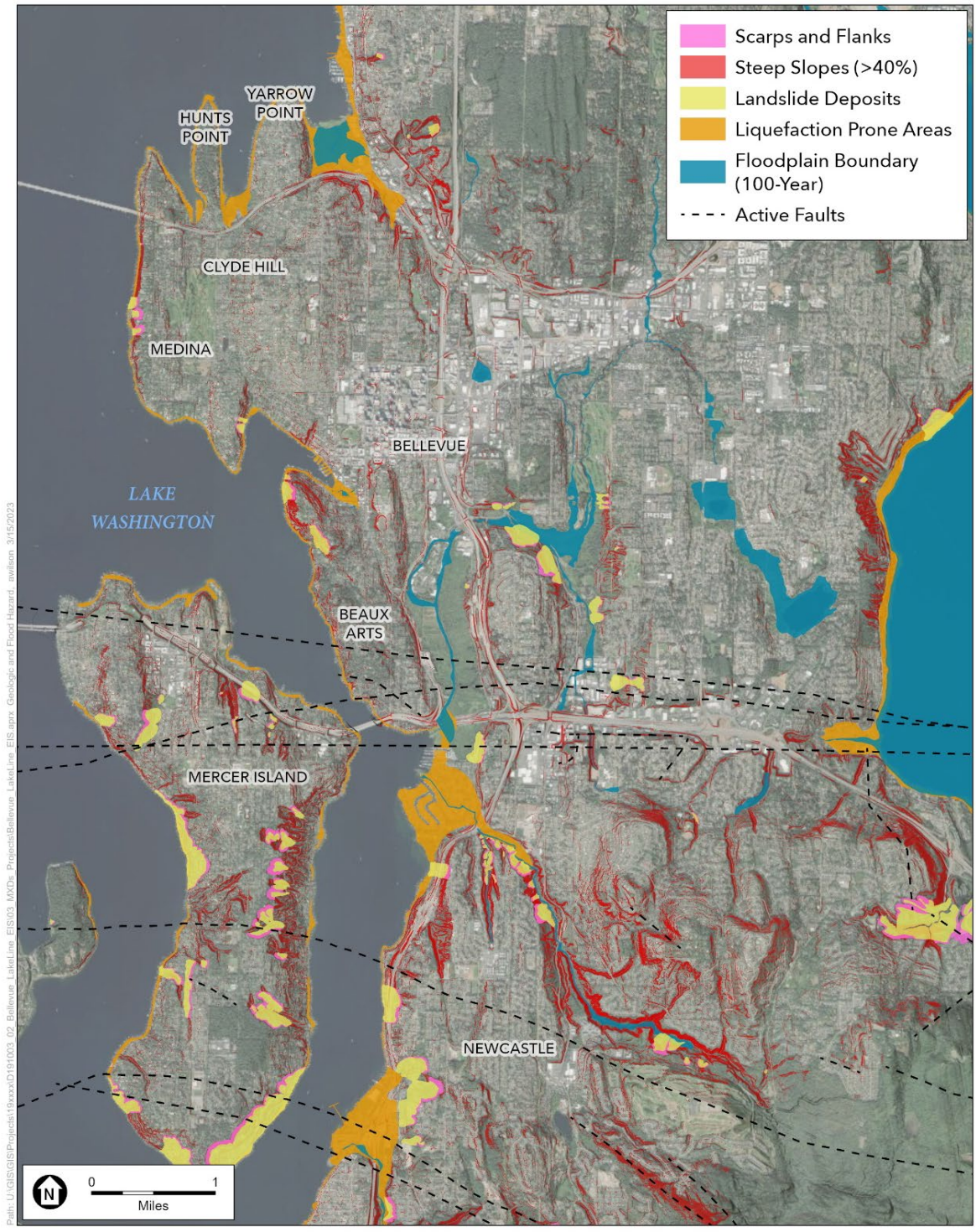
This section describes the existing earth resources and applicable policies, plans, and regulations for the Plan area and other potentially affected areas.

3.2.1 What is the geologic setting of the Plan area?

The Seattle-Tacoma-Bellevue metropolitan area is situated within the Puget Sound Lowland, a basin located between the Olympic Mountains to the west and the Cascade Range to the east (Troost et al. 2003; Troost and Booth 2008). The unique geology in Bellevue and the surrounding region results from the movement of materials caused by tectonic, volcanic, glacial, fluvial (river), coastal, and gravity- driven processes, as well as human-induced changes. The range of processes at work creates a degree of geological variation and complexity uncommon in most major metropolitan areas. This complexity presents serious challenges for construction and development projects. Subsurface conditions may vary greatly and unpredictably over short distances, and projects frequently must contend with multiple geological concerns.

The dominant geological process that contributed to the current landforms in the Plan area is the repeated cycle of glacial advance and retreat. The greater Seattle area is located on top of a complex and incomplete succession of glacial and nonglacial deposits extending below sea level and above an irregular bedrock surface. The glaciation in the area from within the last 2.4 million years left behind complex geologic materials, in addition to eroding, reworking, and burying evidence of previous glaciations. The subsurface materials are deformed by gentle folds and faults, and some sediments that predate the last glacial-interglacial cycle are exposed by erosion on the upland, notably along shorelines, including the shorelines of Lake Washington (Troost and Booth 2008).

Seismic processes have also affected the Plan area, which is in a seismically active region located near the Cascadia Subduction Zone, a collision boundary where the Juan de Fuca tectonic plate dives beneath the North American plate. Of six known surface faults within Puget Sound, the Seattle Fault Zone is of particular relevance because the greater Seattle area sits astride this fault. This east-west trending fault runs roughly parallel to I-90 from southern Bainbridge Island, through south Seattle, across Lake Washington, and into the Bellevue area and beyond (**Figure 3.2-1**). The southern portion of the Plan area intersects the Seattle Fault Zone.



Sources: Scarps and Flanks, Active Faults, Landslide Deposits: WA Geological Survey 2022; 100-Year Floodplain: King County 2022; Liquefaction Prone Areas, Steep Slopes: City of Bellevue 2022, WADNR 2021

Bellevue Lake Line EIS

Figure 3.2-1
Geologic and Flood Hazard Areas

3.2.2 What is the regulatory setting for earth resources?

This section includes information on the geology and soils in the Plan area and describes the regulations that apply to these resources. The Growth Management Act (GMA) requires that each city and county in Washington State identify, designate, and protect critical areas found in their local environment, which include geologic hazardous areas such as areas susceptible to erosion, sliding, earthquakes, or other geologic events. The entire waterfront portion of the Plan area along Lake Washington is in a liquefaction-prone area, designated as a seismic hazard area, which is included as a critical area in all the locality regulatory settings as described below. As such, permitting requirements specific to modifications in critical areas would be applicable to any projects proposed in the Plan area.

City of Bellevue

The City of Bellevue Land Use Code (BCC) Part 20.25H, Critical Areas Overlay District, establishes criteria for defining geological hazards and regulates development within geologic hazard areas. Authorization to disturb, develop, or otherwise modify a critical area, critical area buffer, or critical area structure setback is required through a Critical Areas Land Use Permit (BCC Part 20.30P). Portions of the Plan area within the City of Bellevue that are located within a geological hazard or critical area are shown on **Figure 3.2-1**. The criteria noted in the BCC for critical areas is described below (BCC 20.25H.120).

- Landslide Hazards:
  - Include areas of slopes of 15 percent or more with more than 10 feet of rise, that display areas of historic failures, including those areas designated as quaternary slumps, earthflows, mudflows, or landslides; areas that have shown movement during the past 13,500 years or that are underlain by landslide deposits; slopes that are parallel or subparallel to planes of weakness in subsurface materials; slopes exhibiting geomorphological features indicative of past failures such as hummocky ground and back-rotated benches on slopes; areas with seeps indicating a shallow groundwater table on or adjacent to the slope face; or areas of potentially instability because of rapid stream incision, stream bank erosion, and undercutting by wave action.
  - Established critical area buffer in geologic hazard critical areas for landslide hazards: 50 feet from the top of the slope.
- Steep Slopes:
  - Slope of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.
  - Established critical area buffer in general geologic hazard critical areas for steep slopes: 50 feet from the top of the slope.
- Coal Mine Hazards:
  - Areas designated on the Coal Mine Area Maps or in the City's coal mine area regulations, Land Use Code (LUC) 20.25H.130, as potentially affected by abandoned coal mines.

- Seismic Hazards:
  - Areas of known faults or Holocene displacement, based on the most up-to-date information, or areas mapped areas of "moderate to high" or "high" hazard liquefaction susceptibility by the Washington Department of Natural Resources Liquefaction Susceptibility Map of King County (Palmer et al. 2004), as amended.

Development within these geologic hazard areas and the critical area buffers is subject to required performance standards and restrictions during design and construction, such as required structures and minimization of impervious surfaces. Development on steep slopes is not permitted in most cases. The City of Bellevue has adopted erosion and sediment control standards for all projects involving land disturbance, including additional provisions related to erosion and sediment control requirements for mitigation or restoration plans for geologic hazard critical areas (BCC 20.25H.135).

Environmentally critical areas such as streams and wetlands are described in Section 3.4, *Surface Water Resources* (including the other localities in the Plan area). The City of Bellevue has adopted erosion and sediment control standards for all projects involving land disturbance (including the other localities in the Plan area).

Town of Beaux Arts Village

The 2015 Beaux Arts Village Comprehensive Plan requires identification and policy formulation to protect critical areas within their borders, including geologically hazardous areas (Town of Beaux Arts 2015). The Town commissioned a survey in 1993 to identify geologically hazardous areas, which is incorporated into its Comprehensive Plan. The SMP, including the Shoreline Analysis Report, is also indicated as a reference for information on geologically hazardous areas in Beaux Arts Village.

Within the Beaux Arts Village SMP, critical areas are defined under Chapter 36.7 of the RCW, which includes geologically hazardous areas. Geologically hazardous areas are areas susceptible to erosion, sliding, earthquake, or other geological events. An area is designated as a geologically hazardous area if it is susceptible to one or more of the following hazard types: erosion, landslide, or seismic hazard. Below is a summary of the designated specific hazard areas:

- Erosion hazard area.
- Landslide hazard area.
- Areas of historic failures.
- Areas with slopes steeper than 15 percent, hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and springs or groundwater seepage.
- Areas that have shown movement during the last 10,000 years.
- Slopes that are parallel or subparallel to planes of weakness in subsurface materials.
- Slopes having gradients steeper than 80 percent subject to rock fall during seismic shaking.

- Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet, except areas composed of consolidated rock.
- Seismic hazard areas.

Adopted critical area maps are identified as guides for any potential construction projects and are not a final critical area designation. The minimum buffer and building setback from any geologic hazard is 25 feet from the top and bottom of the slope. A buffer is also required from all edges of erosion or landslide hazard areas, at a minimum of equal to the height of the slope or 25 feet from the top and bottom of the slope, selecting the greater. Specific standards and specifications apply to construction in critical areas. Portions of the Plan area within the Town of Beaux Arts Village that are located within a geological hazard or critical area are shown on **Figure 3.2-1**.

Construction in geologically hazardous areas is subject to a critical area report, including site and construction plans, a geological characteristics assessment, and additional analyses related to slope and potential impacts. Additional required reports may include an erosion and sediment control plan, drainage plan, mitigation plan, surface water monitoring, and long-term mitigation plan. Geologically hazardous areas are protected from all shoreline uses and activities and associated intensity of human use that would adversely affect the natural features of the areas. Additionally, on-site sewage disposal systems are prohibited within erosion and landslide hazard areas and related buffers (Town of Beaux Arts 2014).

City of Medina

The City of Medina Municipal Code establishes criteria for defining geological hazards and regulates development within geologic hazard areas (MMC 16.050.090). Geologically hazardous areas are defined as areas susceptible to erosion, sliding, earthquake, or other geologic events. Below is a summary of the designated specific hazard areas.

- **Erosion Hazard Areas** – As identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "moderate to severe," "severe," or "very severe" rill and inter-rill erosion hazard.
- **Landslide Hazard Areas** – Areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors, including: areas of historic failures; areas with slopes steeper than 15 percent, hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and springs or groundwater seepage; slopes that are parallel or subparallel to planes of weakness in subsurface materials; areas potentially unstable because of rapid stream incision, streambank erosion, and undercutting by wave action; areas located in a canyon or on an active alluvial fan subject to flooding; and steep slopes with a slope of 40 percent or steeper. In a landslide hazard area, the minimum buffer is equal to the height of the slope or 50 feet, whichever is greater.
- **Seismic Hazard Areas** – Areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting.

For potential construction in critical areas, adopted critical area maps are identified as guides for and are not a final critical area designation. Construction in geologically hazardous areas is

subject to a geotechnical report and critical areas report, as applicable. Additional required reports may include an erosion and sediment control plan, drainage plan, and surface water monitoring. On-site sewage disposal systems are prohibited within erosion and landslide hazard areas and related buffers (MMC 16.50.090(I)(9)). Portions of the Plan area within the City of Medina that are located within a geological hazard or critical area are shown on **Figure 3.2-1.**

Town of Hunts Point

The 2015 Town of Hunts Point Comprehensive Plan defines critical areas as wetlands, areas with a critical recharging effect on aquifers, conservation areas, frequently flooded areas, and geologically hazardous areas. Geologically hazardous areas are protected from all shoreline uses and activities and associated intensity of human use that would adversely affect the natural features of the areas. Development and alteration of critical areas are limited and regulated by the Hunts Point Critical Areas Regulations in Shoreline Jurisdiction, Appendix C of the Town of Hunts Point Shoreline Master Program (Town of Hunts Point 2015). Portions of the Plan area within the Town of Hunts Point that are located within a geological hazard or critical area shown on **Figure 3.2-1.**

Town of Yarrow Point

The 2018 Town of Yarrow Point Comprehensive Plan defines critical areas as wetlands, areas with a critical recharging effect on aquifers, fish and wildlife habitat conservation area, frequently flooded areas, and geologically hazardous areas. Any construction in geologic hazard areas, specifically areas subject to erosion, must comply with engineering and construction requirements as part of the building and site development review process to ensure that public health and safety are protected. Portions of the Plan area within the Town of Yarrow Point that are located within a geological hazard or critical area are shown on **Figure 3.2-1.**

King County

The King County 2016 Comprehensive Plan updated July 2020, Chapter 5 Section 5, Geologically Hazardous Areas, establishes policies for designating geologically hazardous areas in King County, which include coal mine, erosion, seismic, landslide, steep slope, and volcanic hazardous areas (King County 2016). King County Code Title 21A, Zoning, provides the regulatory framework for these policies and regulates development within geologic hazard areas.

Portions of the Plan area within King County that are located within a geological hazard or critical area are shown on **Figure 3.2-1**. Below is a summary of the designated specific hazard areas and their associated restrictions:

- Erosion hazard area (KCC 21A.06.415) – *"an area underlain by soils that is subject to severe erosion when disturbed."*
  - Development standards (KCC 21A.24.220) – Time of year restriction for clearing in erosion hazard area and clearing of existing vegetation in all erosion hazard areas is prohibited for all subdivisions, short subdivisions, binding site plans or urban planned developments until building permits are approved for development on individual lots.

- Landslide hazard area (KCC 21A.06.680) – *"an area subject to severe risk of landslide, such as areas with combination of slopes steeper than 15 percent, impermeable soils, springs or ground water seepage; area that has shown movement during the last ten thousand years; an area potentially unstable as a result of rapid stream incision, stream bank erosion or undercutting by wave action; an area that shows evidence of or is at risk from snow avalanches; or an area located on an alluvial fan, presently or potentially subject to inundation by debris flows or deposition of stream-transported sediments."*
  - Development standards (KCC 21A.24.280) - A buffer is required from all edges of the landslide hazard area, size as determined based on the critical area report; minimum buffer of 50 feet if landslide hazard area has a vertical rise of less than 200 feet.
- Seismic hazard area (KCC 21A.06.1045) – *"an area subject to severe risk of earthquake damage from seismically induced settlement or lateral spreading as a result of soil liquefaction in an area underlain by cohesionless soils of low density and usually in association with a shallow groundwater table."*
  - Development standards (KCC 21A.24.290) – Alterations to seismic hazard areas only approved if certain conditions are met, such as the site-specific subsurface conditions show that the proposed development site is not located in a seismic hazard area, or the best available engineering and geological practices are used that either eliminate or minimize the risk of structural damage or injury resulting from seismically induced settlement or soil liquefaction.
- Steep slope hazard area (KCC 21A.06.1230) – *"an area on a slope of 40 percent inclination or more within a vertical elevation change of at least 10 feet."*
  - Development standards (KCC 21A.24.310) – Alterations within a steep slope hazard area are restricted to certain conditions as defined in KCC 21A. 24.045; a minimum buffer from the edges of steep slope areas of 75 and 50 feet for new structures and substantial improvements to existing structures on sites where any portion of the steep slope hazard area extends into the coastal high hazard area or sea level rise risk area and for all other development, respectively; other conditions apply for alterations, such as the prohibition of removal of any vegetation from a steep slope hazard area or buffer.

3.2.3 How can geologic hazards affect facility construction and operation?

The presence of geologic hazards can affect the siting, design, construction, and operation of wastewater facilities. Special considerations will need to be taken into account in areas containing geologic hazards, including review of the area by a professional geotechnical engineer. Geologic hazards in the Plan area are illustrated in **Figure 3.2-1** and summarized as follows:

- Areas with loose, saturated soils that are prone to liquefaction present challenges for construction. These types of soils can shift or settle over time, causing problems for facilities built on them. Areas containing peat are prone to compression and can also settle following construction.
- Steep slopes that are prone to landslides can also have a high potential for erosion, particularly if vegetation is disturbed, causing problems during and after construction. Eroded sediment can also enter waterbodies and degrade aquatic habitats.
- Areas containing artificial fill or lands substantially modified by humans may be challenging due to adverse or unpredictable soil characteristics. The construction potential of artificial fill

depends on technique and material type of the fill. Fill that is unsuited to construction may need to be removed or remediated to prevent problems such as settlement or expansion.

- Areas that have impermeable soils or extensive impervious paved surfaces are more susceptible to accumulating large volumes of water, which can create excessive runoff that results in flooding or other related problems.

3.2.4 What geologic hazards or limitations are present in Plan neighborhoods?

Table 3.2-1 summarizes the geologic hazards present in the Plan neighborhoods based on the City of Bellevue's Map Viewer and WDNR Geologic Information Portal. No coal mine hazard areas or volcanic hazard areas were identified within the Plan area. The entire waterfront portion of the Plan area along Lake Washington is located in a liquefaction-prone area, where in the case of an earthquake or other rapid loading, the strength and stiffness of a soil is reduced (City of Bellevue 2022).

TABLE 3.2-1
SUMMARY OF GEOLOGIC HAZARDS AND LIMITATIONS IN PLAN NEIGHBORHOODS

Neighborhood	Geologic Hazards or Limitations
Lake Washington Jurisdictions	
City of Bellevue	• Interspersed areas of landslide deposits south of Downtown Bellevue. • Southern location atop Seattle Fault Zone puts area at risk for shallow crustal earthquake and surface rupture. • Steep slopes west and south of Downtown Bellevue and at and north of Chism Beach Park.
Beaux Arts Village	• Relatively limited geologically hazardous areas apart from steep slopes.
City of Medina	• Interspersed areas of landslide deposits west of Evergreen Point Road. • Steep slopes along Lake Washington for span of Evergreen Point Road.
Town of Hunts Point	• Relatively limited geologically hazardous areas apart from steep slopes.
Town of Yarrow Point	• Landslide deposit at northernmost point adjacent to Lake Washington. • Steep slopes along periphery adjacent to Lake Washington.
King County	• Location atop Seattle Fault Zone puts area at risk for shallow crustal earthquake and surface rupture. • Steep slopes adjacent to I-90.

3.3 Air Quality and Odor

This section describes the regulations governing air quality, general air quality in the Puget Sound region, and potential sources of odor from wastewater projects.

3.3.1 What is the regulatory setting for air quality?

The federal Clean Air Act defines the U.S. Environmental Protection Agency's (EPA) responsibilities for protecting and improving the nation's air quality. Under the Clean Air Act, the

EPA sets limits on certain air pollutants, including how much pollution can be present in the air anywhere in the United States.

In Washington State, responsibility for implementing the Clean Air Act has been delegated to the Washington State Department of Ecology (Ecology) (WAC 173-442). Locally, air quality is monitored by the Puget Sound Clean Air Agency (PSCAA), a separate organization with jurisdiction over King, Kitsap, Pierce, and Snohomish counties. The PSCAA works in cooperation with the EPA and Ecology and implements specific air quality standards, such as dust control for particulate matter (PSCAA 2011).

The EPA has set federal standards for six "criteria air pollutants." These criteria air pollutants include fine and coarse particulate matter, ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. PSCAA and Ecology monitor and regulate levels of these pollutants to ensure the region meets federal air quality standards.

3.3.2 Why is air quality a concern?

Operation of the wastewater lake line system can contribute to air quality concerns through emissions from vehicles and equipment from periodic maintenance and activities, potential use of emergency generators, and potential for odor generation at wastewater line facilities, such as at pump stations. Additionally, construction during wastewater projects can generate particulates, carbon monoxide, and ozone-creating compounds, which can be of concern to air quality.

- Dust, dirt, soot, and smoke are all considered **particulate matter (PM)**. These materials are easily inhaled into the lungs and pose a host of serious health effects. Particle pollution is described in two subsets: $PM_{2.5}$ which includes fine particles below 2.5 microns and is easily inhaled, and PM_{10} which includes particles below 10 microns in diameter. $PM_{2.5}$ emissions from transportation sources and industry contribute to pollution levels. Elevated fine particle levels ($PM_{2.5}$) represent the greatest criteria air pollutant challenge facing the Puget Sound region.
- **Carbon monoxide** is a colorless, odorless, toxic gas commonly formed when carbon-containing fuel is not burned completely. Motor vehicles are the main source of carbon monoxide in the Puget Sound region.
- **Ozone** is a pungent-smelling, colorless gas produced in the atmosphere when nitrogen oxides and volatile organic compounds chemically react under sunlight and heat. The highest ozone levels occur on hot summer afternoons. Ozone levels remain a concern in the Puget Sound region.

The other three of the six criteria air pollutants are sulfur dioxide, nitrogen dioxide, and lead.

- **Sulfur dioxide** is a colorless, corrosive gas produced by burning fuels containing sulfur, such as coal and oil. Sulfur dioxide is also created by industrial processes, such as smelters, paper mills, power plants, and steel manufacturing plants.
- **Nitrogen dioxide** is a reddish-brown gas that comes from motor vehicles. Other sources include industrial boilers and processes, home heaters, and gas stoves.
- **Lead** is a highly toxic metal that was used for many years in household products, automobile fuel, and industrial chemicals. Since the phase-out of lead in fuel and the closure of the

Harbor Island lead smelter, airborne lead is no longer a public health concern in the Puget Sound region (PSCAA 2021).

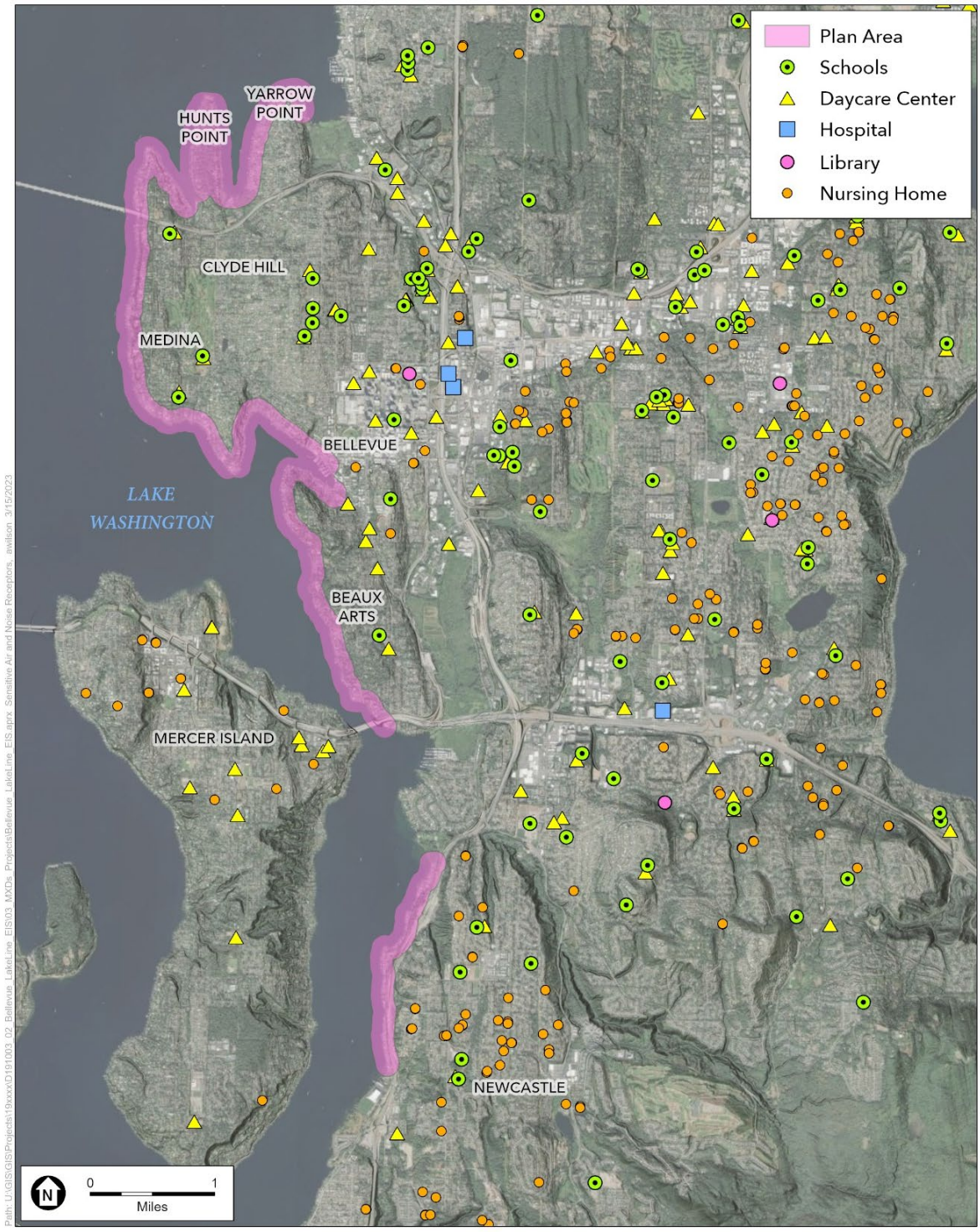
3.3.3 What about odors?

The major sources of odors in the Plan area on land include vehicle emissions. Vehicle exhaust fumes consist largely of carbon monoxide and sulfur compounds and are most noticeable during peak traffic hours on major roadways. In addition to land odors, a potential source of odor near the lake water and along the shoreline of the Plan area includes detritus, dead particulate organic material, distinguished from dissolved organic material which could include water milfoil, a submersed, aquatic plant, leaf litter, and other organic material.

Odors are also generated by wastewater facilities. Odorous compounds in municipal wastewater systems consist mainly of reduced sulfur and nitrogen-based compounds including hydrogen sulfide, methyl mercaptan, and ammonia. The parts of a wastewater system that can create odors include wastewater pipelines, maintenance holes, pump stations, storage facilities, and outfalls. Wet weather results in significant inflows and infiltration of stormwater to the lake line system. This stormwater dilutes the concentration of sulfur and nitrogen compounds in wastewater, lowers the temperature, and increases the velocity through the conveyance system. These factors reduce the potential for significant odors. However, long conveyance distances or increased storage times may cause stagnation, oxygen deprivation, and accompanying odors in wastewater facilities.

3.3.4 What is the existing air quality in the Plan area?

According to PSCAA (2021), air quality in King County was generally good in 2021 (the year with the most recent published data). The air quality index rating in King County was “good” for 84.1 percent of the year, “moderate” for 14.8 percent of the year, and “unhealthy for sensitive groups” for under 1 percent of the year. Sensitive receptors located within the Plan area jurisdictions and adjacent to the Plan area are shown in **Figure 3.3-1**. Single-family residential and multi-family residential land uses are shown in Figure 3.1-1 in Section 3.1. While overall air quality has improved in the last two decades, the levels for fine particles were only met in 2021 when days of wildfire smoke were excluded. As such, elevated fine particle level ($PM_{2.5}$) (and wildfire smoke) remain a great concern for air quality in the region, in addition to ozone levels (PSCAA 2021).



Sources: Schools, Hospitals, Libraries: City of Bellevue 2022; Daycare centers: HIFLD 2022; Nursing Homes: WA DSHS 2022

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Figure 3.3-1
Sensitive Air and Noise Receptors

3.4 Surface Water Resources

This section describes the existing surface water resources and applicable policies, plans, and regulations for the Plan area and other potentially affected areas.

3.4.1 What is the regulatory context for surface waters?

Several state and federal regulations apply to water resources in the Plan area. **Table 3.4-1** provides a summary of state and federal programs, policies, and regulations that are applicable to water resources in the Plan area. Local jurisdictions protect surface water quality by requiring the implementation of construction best management practices (BMPs) to limit erosion and sedimentation. Typically, erosion control measures are reviewed locally through the building permit process. In addition, local jurisdictions protect surface waters under their land use codes, critical areas ordinances, and shoreline master programs.

TABLE 3.4-1
REGULATIONS AND GUIDELINES APPLICABLE IN THE PLAN AREA

Regulation, Policy or Guideline	Description
WDNR Aquatic Use Authorization	An Aquatic Use Authorization is required from WDNR for the use of state-owned aquatic lands. State-owned aquatic lands are navigable lakes, rivers, streams, and marine waters. WDNR may also require surveys or a legal description of the property, a plan of development/operations, bonds, and insurance. SEPA approval and the Hydraulic Project Approval (HPA) need to be completed prior to WDNR issuing the Aquatic Use Authorization.
Shoreline Management Act Permit	Compliance with the Shoreline Management Act (Chapter 90.58 RCW) is required for development in proximity to waterbodies of a certain size. In King County, these waterbodies include lakes greater than 20 acres and streams and rivers over 20 cfs. Shoreline Management Act jurisdiction also includes upland areas associated with these waterbodies—specifically lands within 200 feet of the ordinary high-water mark (OHWM), floodways, some floodplains, and associated wetlands. Shoreline Management Act compliance is achieved through local Shoreline Master Program requirements. Shoreline permitting applies to new structures (buildings, docks, etc.), grading, and other activities, including pipeline construction. Each local jurisdiction maintains its own Shoreline Master Program, as described in Section 3.1.
Clean Water Act	
Clean Water Act (33 U.S. Code 1251 et seq.)	The Clean Water Act establishes the basic structure for regulating pollutant discharges into waters of the U.S. and makes it unlawful to discharge any pollutant from a point source into those waters without a permit. The following rows identify key sections of the Clean Water Act relevant to water quality standards and permitting facilities for which construction or operation would result in a discharge into waters of the U.S.
Clean Water Act Section 303(c)	Section 303(c) directs states to adopt water quality standards for their waters subject to the Clean Water Act. Ecology's surface water quality standards are the basis for water quality protection in Washington and are documented in WAC 173-201A. The standards specify designated uses for waters and establish numeric and narrative water quality criteria protective of those uses.
Clean Water Act Sections 303(d) (Impaired Waters and Total Maximum Daily Loads [TMDLs]) and 305(b) (Water Quality Assessment Report)	Section 303(d) establishes a process to identify and clean up polluted waters, and Section 305(b) requires states to submit a report on the water quality status of waters to the EPA every 2 years. In Washington, Ecology performs the Water Quality Assessment, develops the 303(d) list of impaired waters, and leads TMDL development.

Regulation, Policy or Guideline	Description
Clean Water Act Section 401 (Water Quality Certification)	Section 401 provides states the authority to ensure that federal agencies do not issue permits or licenses that violate state water quality standards or other protections of the Clean Water Act. In Washington, Ecology is the certifying agency and is responsible for issuing 401 Water Quality Certifications.
Clean Water Act Section 402 (National Pollutant Discharge Elimination System [NPDES])	Section 402 establishes the NPDES program, requiring that pollutant discharges to surface waters be authorized by a permit. NPDES permit requirements initially applied to point source discharges, but the program was expanded in 1987 to explicitly include stormwater discharges, including construction stormwater discharges. Ecology administers the NPDES permitting program in Washington for non-federal operators for projects that have the potential to discharge stormwater to surface waters.
Clean Water Act Section 404 (Dredged/Fill Material Discharge Permits)	Section 404 establishes a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. The U.S. Army Corps of Engineers (Corps) issues Section 404 permit decisions.

3.4.2 What are the surface water resources in the Plan area?

This section describes the major surface water resources within the Plan area as well as water quality and pollutant sources.

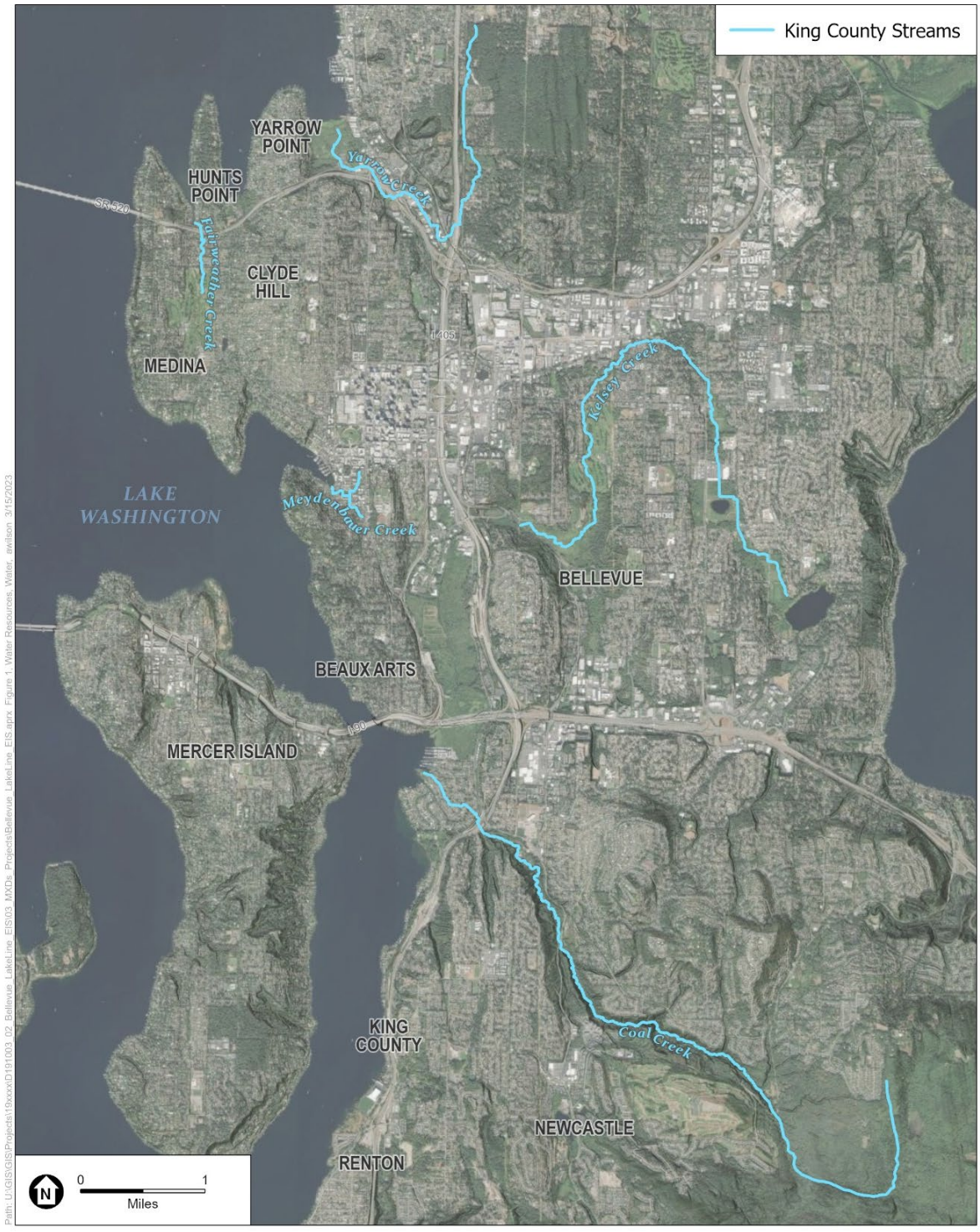
Lake Washington

The Plan area spans a portion of the eastern shoreline of Lake Washington (**Figure 3.1-1**), with the LWWLL located within Lake Washington or its shoreline jurisdiction. The shoreline of Lake Washington is dominated by residential development, but also contains natural or recreational areas such as parks interspersed throughout. Lake Washington is located within the Cedar/Sammamish Watershed (Water Resource Inventory Area [WRIA] 8) and has the Cedar and Sammamish rivers as well as several other smaller tributaries draining into it.

Streams

Multiple streams are found throughout the Plan area, including the following (**Figure 3.4-1**):

- **Yarrow Creek** with its outlet located at the Yarrow Bay Wetlands.
- **Fairweather Creek** is located east of the Fairweather Nature Preserve in Medina.
- **Meydenbauer Creek** is located just south of Meydenbauer Beach Park in the City of Bellevue.
- **Kelsey Creek** is not included in the area of analysis, but it flows into the Mercer Slough.
- **Coal Creek** is located in Newport Shores approximately 1,800 feet south of I-90, just outside of the Plan area.
- Several other unnamed/unknown creeks drain into Lake Washington.



SOURCE: Imagery: Maxar, 2021; Streams: King County, 2022; ESA, 2022

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Figure 3.4-1
Water Resources

3.4.3 What is the surface water quality in the Plan area?

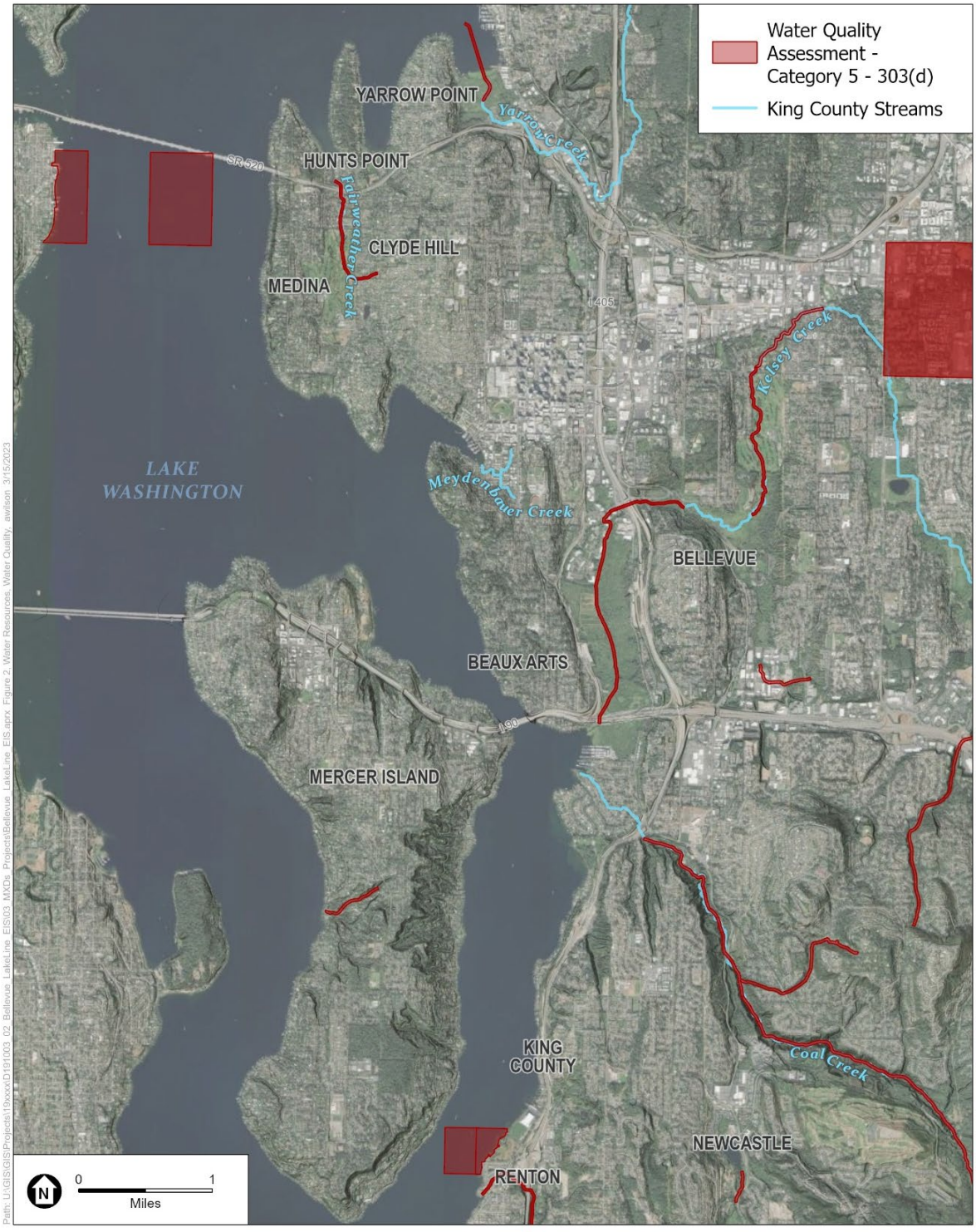
Water quality in Lake Washington has been historically degraded due to both point and nonpoint pollution sources. Point source pollution is defined by the EPA as *"any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or factory smokestack"* (NOAA 2022). Unlike point sources, nonpoint pollution sources come from diffuse sources such as runoff, stormwater, drainage, or seepage. As runoff moves, it picks up pollutants such as fertilizers, pesticides, and petroleum projects, transporting them to waterbodies where they are deposited (Confluence Environmental Company 2022a).

The LWWLL protects water quality by managing and transporting untreated wastewater to the regional wastewater treatment system. The LWWLL also represents a threat to water quality, as leaks or system failures could cause water quality problems if untreated wastewater enters surface waterbodies, which represents a water quality concern as well as a public health hazard. As an example, beaches on Lake Washington were closed several times in summer 2022 because of wastewater inputs resulting from sewer overflows.

Other water resources adjacent to the Plan area, including Mercer Slough, Coal Creek, and Kelsey Creek, could contribute to poor water quality in Lake Washington. Additionally, poor water quality conditions in other portions of Lake Washington outside of the Plan area could impact the water quality within the Plan area along the eastern shoreline of Lake Washington (**Figure 3.4-1**) (Confluence Environmental Company 2022a).

Washington State is required by the federal Clean Water Act to perform water quality assessments on the status of streams, rivers, lakes, and marine waterbodies every 2 years. This monitoring is conducted by Ecology, who assigns waterbodies into five (1–5) categories. Category 1 are waters that meet that state water quality standards, but being placed in this category does not mean the waterway is free of pollutants. Category 2 waters have some evidence of water quality issues, but not enough to show persistent water quality issues. Category 3 waters have insufficient data to place them into other categories. Category 4 waters have impairment problems that are being solved in one of three ways: (Category 4a) has an EPA-approved Total Maximum Daily Load (TMDL) plan in place, (Category 4b) has a pollution control plan, or (Category 4c) impaired waters that cannot be addressed through a TMDL plan. Category 5 waters, also referred to the 303(d) list, are considered the most polluted and require a water improvement project (Ecology 2022a).

Most waters in the Plan area are Category 1 or 2. However, several waterbodies are listed as Category 5 within the Plan area (see **Figure 3.4-2**), including Yarrow Bay for dissolved oxygen and bacteria and Fairweather Creek for oxygen, bacteria, copper, and temperatures. Mercer Slough, Kelsey Creek, and Coal Creek are also listed as Category 5 waterbodies, but they are located just outside of the Plan area (Ecology 2022b). However, that does not mean they cannot influence the water quality within the Plan area. **Table 3.4-2** lists the status of water quality in the vicinity of the Plan area.



SOURCE: Imagery: Maxar, 2021; Water Quality: WDFW, 2022; ESA, 2022

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Figure 3.4-2
Water Quality

TABLE 3.4-2
WATERBODIES AND WATER QUALITY IN THE PLAN AREA

Waterbody	Water Quality[1]
Yarrow Creek and Yarrow Bay Wetlands	Category 5: dissolved oxygen and bacteria
Lake Washington	Category 2: ammonia-N; sediment bioassay Category 1: bacteria, total phosphorus
Fairweather Creek	Category 5: dissolved oxygen, bacteria, copper, and temperature
Meydenbauer Bay	Category 2: ammonia-N, mercury Category 1: bacteria, total phosphorus

(1) Water quality is based on the Ecology (2022a) categories that include Category 5 waterbodies on the 303(d) list of impaired waterbodies where a cleanup plan is needed.
(2) Definitions (note: colors match Ecology [2022a] on-line database and Figure 3.4-2):
Category 5: polluted water that requires a water improvement project.
Category 2: water of concern.
Category 1: meets tested standards for clean water.

SOURCE: Ecology 2022, via Confluence Environmental Company

No large-scale contaminated sites are located within Lake Washington in the Plan area (Ecology 2022c). Therefore, it is unlikely that contaminated sediment would contribute to water quality issues within the lake.

3.5 Fisheries and Aquatic Ecosystems

This section describes the habitat provided by the major aquatic resources in the Plan area as well as the fish and other aquatic species found there. Aquatic resources in the Plan area include Lake Washington, its tributaries, and several wetland complexes. These aquatic resources provide valuable habitat for several salmonids and other fish species.

3.5.1 What is the regulatory context for fisheries and aquatic ecosystems in the Plan area?

Several federal, state, and local regulations protect aquatic resources in the Plan area. **Table 3.5-1** provides a summary of programs, policies, and regulations that are applicable to fisheries and aquatic resources in the Plan area.

TABLE 3.5-1
REGULATIONS AND GUIDELINES APPLICABLE TO AQUATIC RESOURCES IN THE PLAN AREA

Regulation, Statute, Guideline	Description
Federal	
Endangered Species Act (16 U.S. Code 1531 et seq.)	Section 7 requires consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) when undertaking a federal action to ensure the conservation of any listed animal species and critical habitat so as not to jeopardize the continued existence of any listed species. NMFS manages listed marine species, while USFWS manages listed terrestrial and freshwater species.

Regulation, Statute, Guideline	Description
Magnuson-Stevens Fishery Conservation and Management Act Provisions; Essential Fish Habitat (67 Federal Regulations 2343)	Governs marine fisheries management in U.S. federal waters; federal agencies are required to consult with NMFS on activities that may affect Essential Fish Habitat. Essential Fish Habitat in Lake Washington includes habitat for Chinook and Coho Salmon.
Fish and Wildlife Coordination Act (16 U.S. Code 661)	Requires equal consideration and coordination of wildlife conservation with other water resources development programs and provides authority to USFWS and NMFS to evaluate impacts on fish and wildlife from federal actions that result in modifications to waterbodies.
State	
Washington State Endangered Species Act	Oversees the listing and recovery of those species in danger of being lost in the state. Pertains to all state-listed threatened and endangered species.
Washington State Hydraulic Code, Hydraulic Project Approval (WAC 220-660)	Regulates hydraulic projects (construction or performance of work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state) by requiring a Hydraulic Project Approval (HPA) for all such projects. The purpose of the HPA is to ensure that construction or performance of work is done in a manner that protects fish life.
Priority Habitats and Species (PHS) Program	State nonregulatory program that provides information on documented locations of fish and aquatic resources, terrestrial plants and animals, and habitats listed or defined as priority. Priority species include state endangered, threatened, sensitive, or candidate species; animal aggregations considered vulnerable; and species of recreational, commercial, or tribal importance that are vulnerable (WDFW 2023).
Washington State Shoreline Management Act	Shorelines of the state (defined in RCW 90.58.030(2)) are regulated through the Shoreline Management Act (SMA). The SMA is administered by Ecology, who delegates authority to local jurisdictions to manage their shorelines through the preparation and implementation of a Shoreline Master Program (SMP).
Growth Management Act (RCW 36.70A)	Requires all cities and counties in Washington to adopt development regulations, according to the best available science, that protect critical areas as defined in RCW 36.70A.030(5), including fish and wildlife habitat conservation areas.
Local	
King County Code Chapter- 21A.24 Critical Areas; Chapter 21A.25 Shorelines	The Growth Management Act requires all cities and counties in Washington to adopt development regulations, according to the best available science, that protect critical areas as defined in RCW 36.70A.030(5). The Washington State Shoreline Management Act of 1971 requires all local jurisdictions with Shorelines of the State to adopt SMPs consistent with the SMA. The SMP for each of the jurisdictions that the LWWLL serves defines policies and regulations for shoreline land uses, protection and preservation of the shorelines environmental resources, and protection of the public's right to access and use state shorelines.
Bellevue Municipal Code Chapter- 20.25H Critical Areas; City of Bellevue Shoreline Master Program	
Beaux Arts Village Municipal Code Chapter- 16.10 Shoreline Master Program; Chapter 16.15 Wetlands Protection	
Medina Municipal Code Chapter 16.50. Critical Areas Chapter 16.6 Shoreline Master Program	
Yarrow Point Shoreline Master Program	
Hunts Point Municipal Code Chapter 16.10 Shoreline Master Program Chapter 16.15 Sensitive Areas	

3.5.2 What are the aquatic resources in the Plan area?

Lake Washington

Lake Washington and its tributaries are located within WRIA 8, which is a high priority area (Tier 1) for salmon recovery efforts. Both the Cedar and Sammamish rivers connect to the lake, with the Cedar River to the south and the Sammamish River to the north. Several other streams drain into Lake Washington as well (refer to Section 3.4, *Surface Water Resources*).

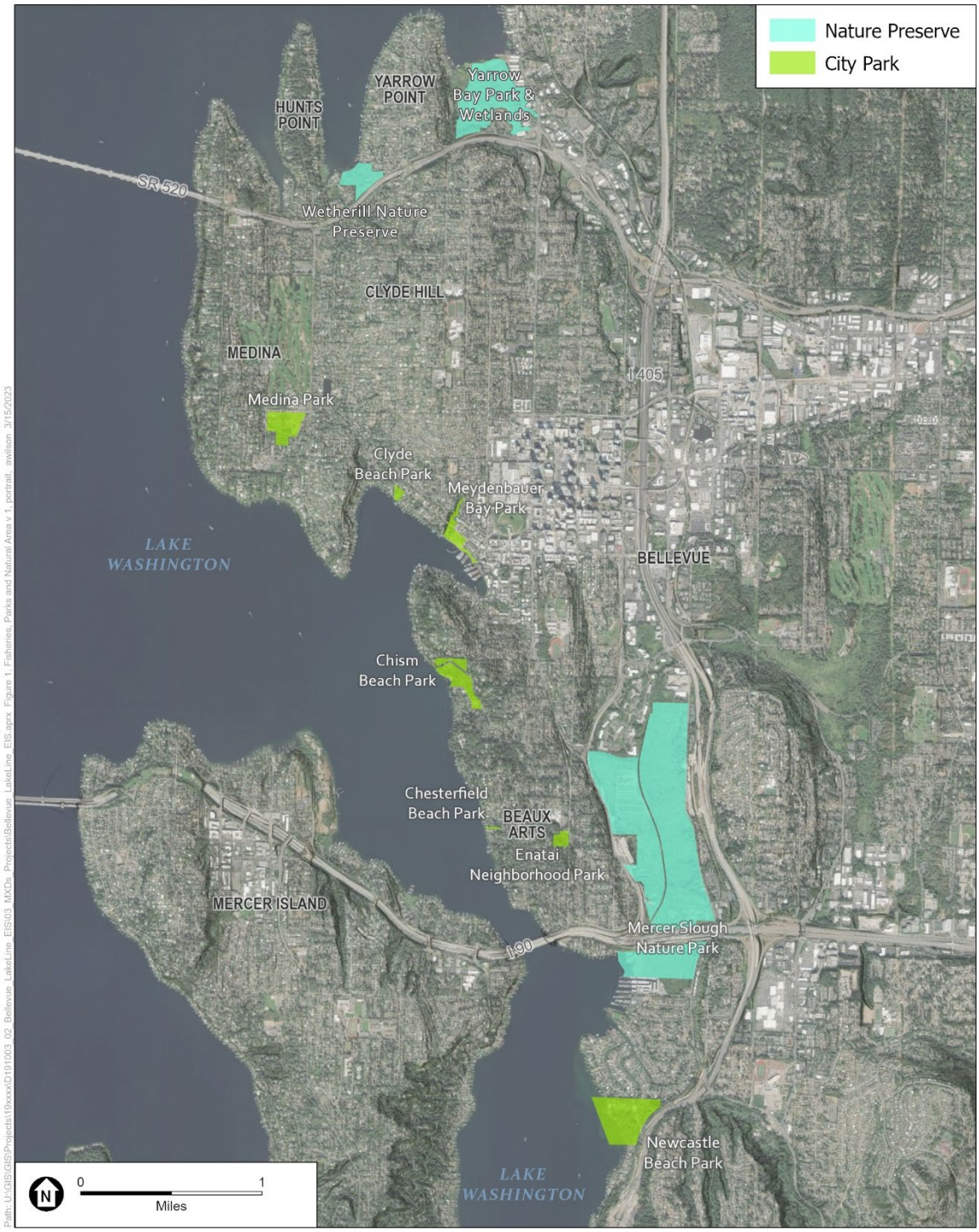
Within the littoral zone of the lake (the transitional area between upland and open water), the aquatic substrate and vegetation provide important habitat for many invertebrates and fish species, including salmonids. The littoral zone is formed from the production, mobilization, and deposition of sediment. Sediment sources include bank erosion and sediment outflows from the tributaries entering the lake. The littoral zone also supports native vegetation and protection from wave action during its establishment (Toft 2001 in Confluence Environmental Company. 2022a). The general substrate conditions throughout the Lake Washington shoreline include sand, gravel, mixed coarse materials, and a layer of silt (The Watershed Company 2011 in Confluence Environmental Company 2022a). Several invasive aquatic plant species, including purple loosestrife (*Lythrum salicaria*) and garden loosestrife (*Lysimachia vulgaris*), both of which are Class B noxious weeds, have been found in Lake Washington (King County 2017 in Confluence Environmental Company 2022a; King County 2022a). Several other non-native aquatic species are also found throughout Lake Washington. New Zealand mudsnails were first detected in Lake Washington in 2011 and have since been found in its tributaries, including Kelsey Creek. New Zealand mudsnails are easily transported to other areas by people, pets, wildlife, and equipment. They are problematic because they can multiply quickly and have no natural predators, disease, or parasites to help control their populations (King County 2016).

Most land uses along the Lake Washington shoreline are single- or multi-family residential developments that do not support natural sediment processes or aquatic vegetation due to the presence of docks, bulkheads, and other erosion control structures. However, park beaches and nature preserves (**Figure 3.5-1**), which are dispersed throughout the residential development, are still able to promote natural sedimentation processes. Several of these parks also include wetlands that are described below.

Although most of the shoreline has been developed and modified (e.g., bulkheads, docks, and shoreline armoring) in ways that can prevent natural bank erosion, Lake Washington still provides some habitat complexity and sediment processes that establish and maintain aquatic environments. In general, the ecological condition of the Lake Washington shoreline is considered to have low to moderate habitat value (The Watershed Company 2011 in Confluence Environmental Company 2022a).

Streams

As described in Section 3.4, *Surface Water Resources,* several streams cross through the Plan area when draining into Lake Washington. These streams provide fish and wildlife with habitat and other resources needed for survival.



SOURCE: Imagery: Maxar, 2021; Nature Preserves and City Parks: City of Bellevue, 2021; ESA, 2022

Bellevue Lake Line EIS

Figure 3.5-1
Parks and Natural Areas

3.5.3 What are the fish resources in the Plan area?

A large variety of fish are found in Lake Washington and the surrounding tributaries. The WDFW Priority Habitats and Species (PHS) database provides information on priority habitat locations throughout the state of Washington, and lists seven fish species as occurring in Lake Washington and its associated streams (**Figure 3.5-3**). Of these seven species, three are federally listed under the Endangered Species Act including, Bull Trout (*Salvelinus confluentus*), Puget Sound Chinook Salmon (*Oncorhynchus tshawytcha*), and Puget Sound steelhead (*O. mykiss*).

Sockeye Salmon (*Oncorhynchus nerka*), kokanee (*O. nerka*), and Coho Salmon (*O. kisutch*) have all been documented within the lake. Habitat for Sockeye Salmon spawning has been documented along the lake's shoreline (Kerwin 2001, WSDOT 2006, The Watershed Company 2009, WDFW 2022a in Confluence Environmental Company 2022a). Other salmonids including resident Rainbow Trout (*O. mykiss*) and resident and adfluvial Cutthroat Trout (*O. clarkii*) have also been documented in stream surveys around Lake Washington (The Watershed Company 2009 in Confluence Environmental Company 2022a). Other non-salmonid species native to Lake

Washington include Prickly Sculpin (*Cottus asper*), Largescale Sucker (*Catostomus macrocheilus*), Largemouth Bass (*Micropterus salmoides)*, Smallmouth Bass (*M. dolomieu*), Yellow Perch (*Perca flavescens*), and Black Crappie (*Pomoxis nigromaculatus*) (The Watershed Company 2009, Fish and Wildlife Commission 2021 in Confluence Environmental Company 2022a; WDFW 2022).

Bull Trout

Bull Trout were federally listed as threatened in 1998 and have remained listed (85 Federal Register [FR] 14240). Several populations have been documented within WRIA 8, which includes north Seattle, the Ship Canal, Lake Union, Lake Washington, Lake Sammamish, and the Cedar and Sammamish rivers and their tributaries. Bull trout may use the Plan area for foraging or migrating to other marine or estuarine foraging habitats (Confluence Environmental Company 2022a). However, it is unlikely they spawn within Lake Washington or the surrounding tributaries due to elevated water temperatures. Lake Washington is designated by the USFWS as critical habitat for Bull Trout (USFWS 2022b). Additionally, while Bull Trout may use Lake Washington for migration, it is unlikely that they would be present in the summer when water temperatures normally exceed 59 degrees F. Lake Washington has been designated as a shared foraging, migration, and overwintering (FMO) area by the Costal Recovery Unit Implementation Plan (USFWS 2015 in Confluence Environmental Company 2022a), which allows for the support of continued population dynamics. Mercer Slough is a designated as a shared FMO for Bull Trout (75 FR 63898).

Yarrow, Fairweather, Kelsey, and Coal creeks are all classified as Type F streams by the WDNR. Type F streams are streams that are perennial or seasonal and are known to be used by fish or meet the physical characteristics to be potentially used by fish (City of Bellevue 2022, WDNR 2022 in Confluence Environmental Company 2022a). Meydenbauer Creek is not recognized by WDNR, but is recognized as a stream by the City of Bellevue and King County. Lower Meydenbauer Creek is a fish-bearing stream, likely supporting resident and coastal Cutthroat

Trout and other salmonid species. Additionally, in 2000 and 2001, the following species were observed in Meydenbauer Creek downstream of 101st Avenue SE: Sockeye Salmon, Cutthroat Trout, sculpin, and Three-spine Stickleback (The Watershed Company 2010 in Confluence Environmental Company 2022a). Several other unnamed streams are located along the Lake Washington shoreline within the Plan area, including a WDNR Type U stream (unknown water feature) located in the Cozy Cove Basin, just west of the Wetherill Nature Preserve. Additionally, a Type N stream was recently restored to enhance lakeshore processes and habitat at Meydenbauer Beach Park. The streams support natural sedimentation processes that have been prevented along the shoreline of Lake Washington due to development. These sedimentation processes are beneficial to fish and other aquatic species.

Wetlands

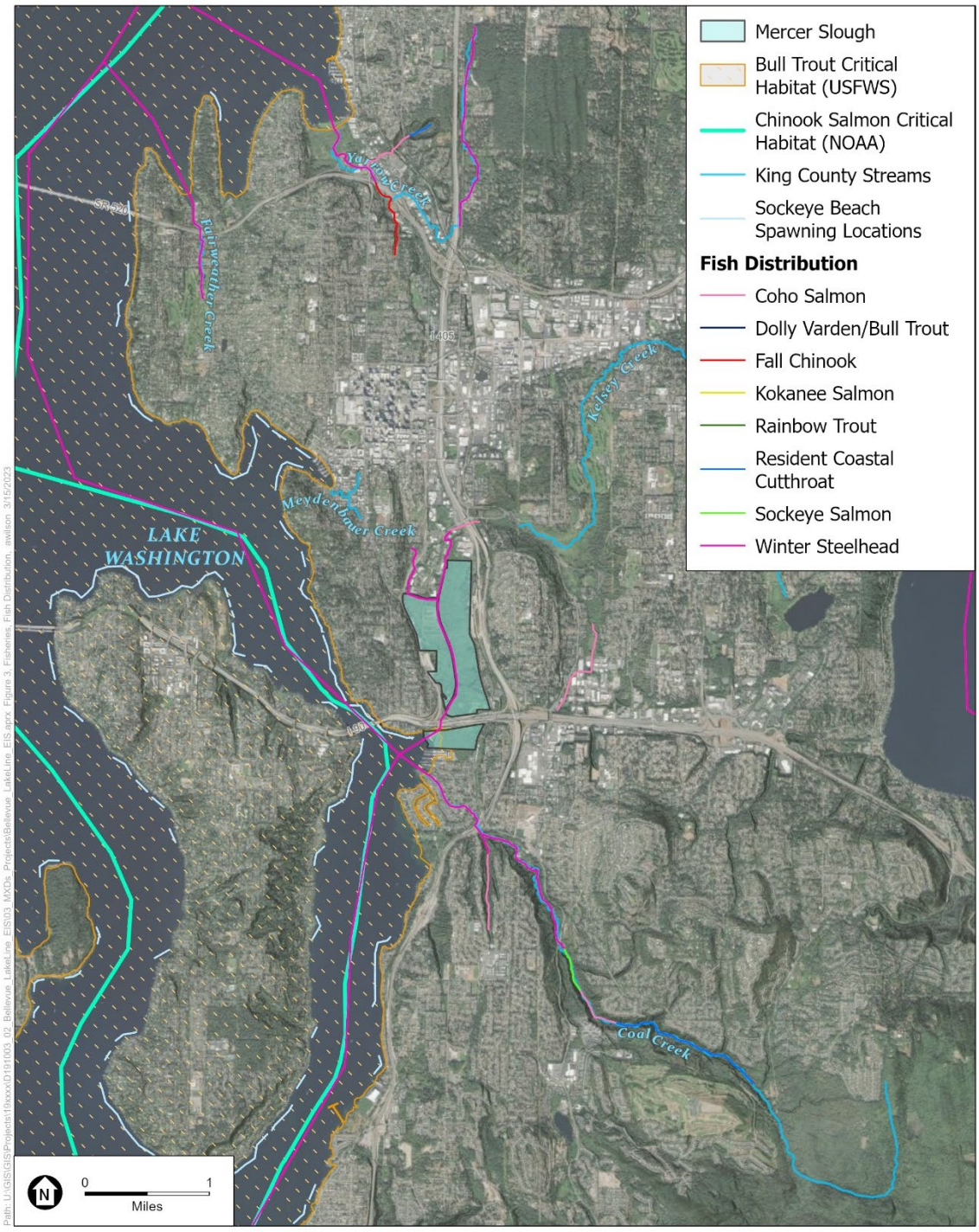
Numerous wetlands and riparian areas are located within the Plan area along the shoreline of Lake Washington. Wetlands and riparian areas provide valuable habitat for fish and other aquatic resources by providing a natural shoreline that promotes natural sedimentation processes. Wetlands and features with other aquatic edges provide amphibian and reptile species with valuable habitat. Notable wetland systems within the Plan area include the following (**Figure 3.5-2**) (riparian areas are further described in Section 3.6):

- Yarrow Bay Wetlands are approximately 88 acres and consist of a combination of palustrine emergent, scrub-shrub, and forested wetland areas that are occasionally to permanently flooded. Yarrow Creek enters Lake Washington through this wetland area, providing riverine habitat with an unconsolidated bottom that is permanently flowing year-round.
- The area between Yarrow Point and Hunts Point (Wetherill Nature Preserve) is approximately 10 acres and is a freshwater forested and scrub-shrub wetland area.
- Beaux Art Village contains approximately 0.5 acre of palustrine emergent wetland that is seasonally flooded. It is located just south of Chesterfield Beach Park.
- Mercer Slough Wetland Complex is a 320-acre wetland area located just east of the Plan area. It is comprised of riverine palustrine forested, scrub-shrub, emergent, and riverine wetland classes that is occasionally to permanently flooded (USFWS 2022a).
- Portions of Meydenbauer Bay also contain lake fringe wetland areas.
- Other smaller wetland systems are located throughout the Plan area, potentially on private property (**Figure 3.5-2**).

SOURCE: Imagery: Maxar, 2021; Priority Habitat Wetlands: WDFW, 2022; ESA, 2022

Bellevue Lake Line EIS

Figure 3.5-2
Wetlands



SOURCE: Imagery: Maxar, 2021; Fish Distribution Priority Habitat Area: WDFW, 2022; Bull Trout Critical Habitat: USFWS, 2022; Chinook Salmon Critical Habitat: NOAA, 2022; Streams: King County, 2022; ESA, 2022

Bellevue Lake Line EIS

Figure 3.5-3
Fish Distribution

Puget Sound Chinook Salmon

Puget Sound Chinook Salmon were listed as threatened in 2005 and have remained listed (70 FR 52630). Chinook Salmon spawning populations are known to utilize Lake Washington for rearing and migration (WDFW 2022d in Confluence Environmental Company 2022a). Lake Washington and Mercer Slough are designated as critical habitat for the Puget Sound Chinook Salmon evolutionarily significant unit (ESU) (70 FR 52630). The WRIA 8 Salmon Recovery Council reports that Chinook Salmon migration in Lake Washington occurs from June through September. Spawning habitat includes the Cedar River, which is recognized as providing the largest amount of natural run Chinook Salmon in all of WRIA 8 (WRIA 8 Salmon Recovery Council 2017 in Confluence Environmental Company 2022a). Other smaller tributaries in the Plan area also provide viable spawning habitat, and in the City of Bellevue includes the Greater Kelsey Creek watershed (WRIA 8 Tier 2 stream), and Coal Creek watershed (WDFW 2020 in Confluence Environmental Company 2022a). Chinook Salmon generally migrate to these tributaries in July–September, with spawning occurring in October (WDFW 2018 in Confluence Environmental Company 2022a). The rearing and outmigration phase for juvenile Chinook Salmon generally occurs from January to June; however, a small amount of Chinook Salmon rearing occurs year-round in Lake Washington (WRIA 8 Salmon Recover Council 2017 in Confluence Environmental Company 2022a).

Puget Sound Steelhead

Puget Sound steelhead were listed as threatened in 2007 (76 FR 50448) and have not been delisted. WRIA 8 supports two populations of steelhead: (1) the natural population originating in the Cedar River, and (2) the population introduced in north Lake Washington. Lake Washington is not designated as critical habitat for Puget Sound steelhead, but it is a known migration route. Adult steelhead migrate through Lake Washington during December to May (WDFW et al. 1993 in Confluence Environmental Company 2022a), spawning primarily in the Cedar River from March to early June (Burton and Little 1997 in Confluence Environmental Company 2022a). However, the Cedar River population has experienced serious declines over the past few decades (WDFW 2018 in Confluence Environmental Company 2022a). Steelhead have also been documented as historically present in Coal and Kelsey creeks, but recent surveys show no presence of them (WDFW 2018 in Confluence Environmental Company 2022a). Additionally, there have not been enough returning adults to maintain a viable population, so the relative risk of extinction of the winter steelhead population is considered very high (Cram et al. 2018 in Confluence Environmental Company 2022a). Juvenile steelhead use the water adjacent to the Plan area as a migratory corridor when leaving WRIA 8 (Kerwin 2001 in Confluence Environmental Company 2022a).

Nonnative Fish and Shellfish Species

Several nonnative fish species occur in the Plan area, including Yellow Perch, Walleye (*Sander vitreus*), Northern Pikeminnow (*Ptychocheilus oregonensis*), Smallmouth Bass, Grass Carp (*Ctenopharyngodon idella*), and Largemouth Bass (The Watershed Company 2009, Fish and Wildlife Commission 2021 in Confluence Environmental Company 2022a). Most of these species are known ambush predators and greatly impact juvenile salmonids. In 2017, the WRIA 8 Salmon Recovery Council identified predation by nonnative fish species as a key constraint on juvenile

Chinook Salmon migration and rearing success in Lake Washington. Additionally, as discussed in Section 3.5.2, New Zealand mudsnails have been found in Lake Washington and several of its tributaries.

3.6 Vegetation and Wildlife

This section describes the existing vegetation and wildlife present in the Plan area and applicable policies, plans, and regulations for the Plan area and other potentially affected areas.

3.6.1 What are the existing vegetation and wildlife resources in the Plan area?

This section describes the types of terrestrial habitat, vegetation, and terrestrial species that may occur within the Plan area.

Terrestrial Setting and Vegetation

The ecosystem within the Plan area consists of mostly urban development along the eastern shoreline of Lake Washington. The largest patches of terrestrial wildlife habitat include parks and other natural areas (**Figure 3.5-1**), which are dispersed throughout the Plan area. Parks and natural areas support a variety of landscapes including riparian corridors and forested areas. Natural, native landscaping provides habitat benefits to area wildlife.

Most of the Plan area contains residential developments that are dominated by heavily landscaped areas. Landscaped areas may still provide native vegetation, as well as ornamental species. Urban and landscaped areas such as gardens, lawns, and recreational parks can still provide important habitat elements such as food, water, and shelter for terrestrial wildlife. Species that utilize landscaped areas are usually those that can tolerate some level of ongoing human disturbance and habitat alteration, including songbirds, crows (*Corvus brachyrhynchos)*, and raccoons (*Procyon lotor)*.

Riparian corridors are the vegetated areas located along streams, typically including deciduous trees and shrubs with a few conifers dispersed throughout. Native vegetation in these areas typically includes red alder (*Alnus rubra*), big leaf maple (*Acer macrophyllum*), dogwood (*Cornus sericea*), and rose (*Rosa* spp.). Common aquatic plants include rushes (*Juncus* spp.), sedges (*Carex* spp.), common cattail (*Typha latifolia)*, duckweed (*Lemnoideae* spp.), water lily (*Nymphaeaceae* spp.), and pondweed (*Potamogeton* spp.). Riparian areas provide important wildlife habitat including forage, cover, and complex habitat structure. This habitat supports a variety of terrestrial species. Riparian corridors also benefit aquatic habitats by providing shade, large wood, and organic material to streams.

Forested areas are likely dominated by conifers such as Douglas fir (*Pseudotsuga menziesii*) or deciduous trees such as big leaf maple or a mixture of both. Ground cover in forested areas typically includes native plants such as sword fern (*Polystichum munitum*), salal (*Gaultheria shallon*), and snowberry (*Symphoricarpos albus*). Forested areas also provide habitat to a wide variety of species.

Wildlife

Species present in the Plan area are likely adapted to an urban environment. Habitat conditions within the Plan area likely support a variety of terrestrial species including songbirds, woodpeckers, raptors (including bald eagles [*Haliaeetus leucocephalus*] and osprey [*Pandion haliaetus*]) and racoons, squirrels, rabbits, and deer (*Odocoileus hemionus columbianus)*. It is also likely that species such as coyote [*Canis latrans*] and river otter [*Lontra canadensis*] are also present within the vicinity of the Plan area.

The USFWS Information for Planning and Consultation (IPaC) system does not map any critical habit for state or federally listed terrestrial wildlife species within the Plan area; however, the north American wolverine (*Gula luscus,* proposed threated), marbled murrelet (*Brachyramphus marmoratus,* threatened), and the yellow-billed cuckoo (*Coccyzus americanus,* threatened) are mapped as potentially occurring within the Plan area. The Plan area is highly urbanized and does not provide suitable habitat for any of these species so it is highly unlikely that they would occur. IPaC also lists the monarch butterfly (*Danaus plexipuss*, candidate for listing) as potentially occurring within the Plan area (USFWS 2022).

Non-native animal species likely to be in the Plan area include rats (*Rattus norvegicus)* and opossums (*Didelphis virginiana)*, typical of an urban area.

Nonnative and Invasive Plant Species

Terrestrial Plant Species

Invasive species such as English ivy (*Hedera helix*) and Himalayan blackberry (*Rubus armeniacus*) are found throughout the Plan area. King County maps the following noxious weed species as occurring within the Plan area: giant hogweed (*Heracleum mantegazzianum*), a Class A noxious weed; and shiny geranium (*Geranium lucidum*) and tansy ragwort (*Jacobaea vulgaris*), both of which are Class B noxious weeds (King County 2022a and 2022b). Bohemian knotweed (*Polygonum x bohemicum*) is also mapped as occurring within the Plan area (King County 2022b) and is a serious threat to our riparian and terrestrial forests.

Aquatic Plant Species

King County maps purple loosestrife and garden loosestrife as occurring within the Plan area. Purple and garden loosestrife are Class B noxious weeds (King County 2022a and 2022b). Other non-native aquatic species found within Lake Washington include Eurasian watermilfoil (*Myriophyllum spicatum*), parrotfeather milfoil (*M. aquaticum*), and fanwort (*Cabomba caroliniana*) (Confluence Environmental Company 2022a). Eurasian watermilfoil is also designated as a Class B noxious weed (King County 2022) and is known to be very problematic along the shoreline of Lake Washington (The Watershed Company 2011 in Confluence in Environmental Company 2022a). Non-native aquatic weeds have been found to provide habitat for ambush predators along the lakeshore throughout the Plan area, contributing to degraded salmonid habitat in WRIA 8.

3.6.2 What is the regulatory context for vegetation and wildlife in the Plan area?

Several federal, state, and local regulations protect vegetation and wildlife in the Plan area. **Table 3.6-1** provides a summary of regulations and guidelines that are applicable to the Plan area.

TABLE 3.6-1
REGULATIONS AND GUIDELINES APPLICABLE TO VEGETATION AND WILDLIFE IN THE PLAN AREA

Regulation, Statute, Guideline	Description
Federal	
Endangered Species Act (ESA) (16 U.S. Code 1531 et seq.)	Section 7 of the ESA requires consultation with the USFWS when undertaking a federal action to ensure the conservation of any ESA-listed animal species and critical habitat, so as not to jeopardize the continued existence of any listed species. USFWS manages listed terrestrial and freshwater species.
Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S. Code 668-668c)	Prohibits the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of bald eagles or golden eagles (*Aquila chrysaetos*), including any part, nest, or egg, unless permitted under the authority of USFWS.
National Baled Eagle Management Guidelines (USFWS 2007)	USFWS developed guidelines to advise landowners, land managers, and others who share public and private lands with bald eagles when and under what circumstances the protective provisions of the Eagle Act may apply to their activities. The guidelines are intended to help people minimize such impacts to bald eagles, particularly where they may constitute "disturbance," which is prohibited by the Eagle Act.
Migratory Bird Treaty Act of 1918, as amended (16 U.S. Code 703-713)	Prohibits the take of all migratory birds, their eggs, parts, or nests unless authorized by a permit under the regulatory authority of USFWS.
State	
WDFW State and Protected Species (220-610 WAC)	WDFW oversees the listing and recovery of state-endangered, threatened, or sensitive species to ensure their survival as populations in the state.
Washington State Shoreline Management Act (90.58 RCW)	The Shoreline Management Act requires counties, cities, and towns to develop and implement Shoreline Master Programs that regulate the use of shorelines, public access, and environmental protection.
Washington State Growth Management Act (36.70A RCW)	The Growth Management Act requires all cities and counties in Washington to adopt development regulations, according to best available science, that protect critical areas as defined in RCW 36.70A.030(5), including fish and wildlife habitat conservation areas.
Local	
Bellevue Municipal Code Chapter-20.25H Critical Areas	The Growth Management Act requires all cities and counties in Washington to adopt development regulations, according to the best available science, that protect critical areas as defined in RCW 36.70A.030(6). Shoreline Master Programs regulate no net loss of ecological functions, of which wildlife and terrestrial habitats are a component.
Beaux Arts Village Municipal Code Chapter 18.10 Zoning	
Hunts Point Municipal Code Chapter 16.15 Sensitive Areas	
King County Code Chapter 21A.24 Critical Areas	
Medina Municipal Code Chapter 16.50.100 Fish and Wildlife Habitat Conservation Areas	

3.7 Noise

This section describes the existing noise sources and applicable policies, plans, and regulations for the Plan area and other potentially affected areas.

3.7.1 What is noise?

Noise is generally defined as unwanted sound. Sound is measurable, whereas noise is subjective. Noise can be generated through both natural sources or human activity either as airborne sound or underwater sound depending on where the sound is perceived. Sound travels faster and farther in and over water because water is denser than air; the speed and distance of the sound depends on the density of the water and frequency of the sound (NOAA Fisheries 2022). Since underwater sound can affect fish and aquatic resources, potential effects on fish and aquatic resources from underwater sound are evaluated in Section 4.5, *Fish and Aquatic Resources*. The following section focuses on airborne sound that is perceptible to the human ear.

The relationship between measurable sound and human perception is the key to evaluating noise impacts. Airborne sound occurs by a rapid fluctuation of air pressure above and below atmospheric pressure. Sound pressure levels are usually measured and expressed in units called decibels (dB). For the purposes of environmental analyses, sound levels are quantified as A-weighted decibels (dBA) on a sound level meter, which correspond to the frequencies that are audible to the human ear. A whisper measures about 30 dBA, while a typical conversation is in the range of 60 to 70 dBA, a siren is in the range of 110 to 129 dBA, and a jet fly-over at 1,000 feet is around 105 dBA (NIDCD 2022; Caltrans 2014). The human ear perceives an increase, or decrease, of 10 dBA as a doubling, or halving, of the sound level; an increase of 3 dBA or less is barely perceptible by the human ear, and an increase of 5 dBA or more is readily perceptible (Caltrans 2014). Sound levels decrease 6 dBA if distance from the noise source is doubled (OSHA 2022). Hearing loss can begin to occur with prolonged exposure to noise at 85 dBA. For context, normal conversation is approximately 60 dB, and the noise from lawn mowers can reach up to 100 dBA (NIDCD 2017).

3.7.2 What is the regulatory setting for noise?

State Noise Regulations

The WAC has rules adopted rules pursuant to Chapter 70.107 RCW, the Noise Control Act of 1974, to establish maximum noise levels permissible within residential, commercial, and industrial districts (WAC 173-60-040) (**Table 3.7-1**), along with exemptions (**WAC 173-60-050**).

TABLE 3.7-1
MAXIMUM PERMISSIBLE NOISE LEVELS

District of Noise Source	District of Receiving Property		
	Residential (day/night) (dBA)	Commercial (dBA)	Industrial (dBA)
Residential	55/45	57	60
Commercial	57/47	60	65
Industrial	60/50	65	70

Noise at any hour of the day or night may exceed the maximum permissible sound levels in any 1-hour period for any receiving property, by no more than:

- 5 dBA for a total of 15 minutes; or
- 10 dBA for a total of 5 minutes; or
- 15 dBA for a total of 1.5 minutes.

Noise from the installation or repair of essential utility services is allowed to exceed the maximum permissible sound levels between 7:00 a.m. and 10:00 p.m. Noise from temporary construction activities in residential areas is allowed to exceed the maximum permissible sound levels between 7:00 a.m. and 10:00 p.m.

Local Noise Regulations

City of Bellevue

The BCC defines the maximum permissible environmental noise levels within residential, commercial, and industrial districts (**Table 3.7-2**), along with permissible modifications (BCC 9.18.030).

TABLE 3.7-2
MAXIMUM PERMISSIBLE SOUND LEVELS BY RECEIVING PROPERTY

District of Sound Source	District of Receiving Property		
	Residential (day/night) (dBA)	Commercial (dBA)	Industrial (dBA)
Residential	55/45	57	60
Commercial	57/47	60	65
Industrial	60/50	65	70

In Bellevue, noise from construction activities in residential areas is allowed to exceed the maximum permissible sound levels between 7:00 a.m. and 10:00 p.m. on weekdays, and between the hours of 9:00 a.m. and 10:00 p.m. on weekends. The limits may be exceeded by 25 dBA for equipment on construction sites, and sounds created by construction are allowed between 7:00

a.m. and 10:00 p.m. on weekdays and 9:00 a.m. and 6:00 p.m. on Saturdays. Construction sounds are prohibited on Sundays without authorization. The BCC also states that *"sounds created by the repair or installation of essential utility services and streets"* are exempt from noise provisions in Chapter 9.18 with specific exemption authorization (BCC 9.18.020).

Beaux Arts Village

Beaux Arts Village Municipal Code (BAVMC) includes noise requirements under the zoning code ordinance and under Chapter 16.05 State Environmental Policy Act, where noise mitigation measures are noted as applicable to potential determinations of non-significance on proposals (BAVMC 16.05.140). The BAVMC indicates that commercial activities (that are approved by the council by permit) are prohibited from increasing the noise level above the level normally produced at a single-family residence (BAVMC 18.10.060).

City of Medina

The Medina Municipal Code defines the maximum permissible environmental sound levels within residential and commercial districts **(Table 3.7-3**), along with permissible modifications (MMC 8.06.120).

TABLE 3.7-3
MAXIMUM PERMISSIBLE SOUND LEVELS

	District of Receiving Property	
District of Sound Source	**Residential (day/night) (dBA)**	**Commercial (day/night) (dBA)**
Residential	55/45	57/47
Commercial	57/47	60/50

Noise from temporary construction activities is allowed to exceed the maximum permissible sound levels between 7:00 a.m. and 7:00 p.m. on weekdays, and between the hours of 9:00 a.m. and 5:00 p.m. on Saturday. Construction equipment may include crawlers, tractors, bulldozers, rotary drills and augers, loaders, power shovels, cranes, derricks, graders, off-highway trucks, ditchers, trenchers, compactors, compressors, and other similar equipment. Impact-type construction equipment and construction creating impulse noise or impact noise are allowed to exceed maximum permissible sound levels between the hours of 8:00 a.m. and 5:00 p.m. on weekdays, and between 9:00 a.m. and 5:00 p.m. on Saturday. However, these temporary construction sounds may not exceed 85 dBA as measured at the property line of receiving properties or 50 feet from the equipment (MMC 8.06.150).

Town of Hunts Point

The Hunts Point Municipal Code adopted provisions of the King County Code including Chapters 12.91 through 12.100, which govern excessive noise and noise control, including all future amendments (HPMC 8.40).

Development and construction activities within the Town of Hunts Point causing noise exceeding 55 dB that crosses property lines are permitted solely between 7:30 a.m. and 4:30 p.m. on weekdays and between 9:00 a.m. and 2:00 p.m. on Saturday (HPMC 15.5.010).

Town of Yarrow Point

The Yarrow Point Municipal Code (YPMC) includes noise requirements under Public Noise Disturbances (YPMC 8.06), Alarms Responded to by the Police and Fire Departments (YPMC 8.12), and Communication Facilities (YPMC 17.30); however, no specific maximum permissible environmental sound levels are indicated. Commercial activities are prohibited from increasing the noise level above the level normally produced at a single-family residence (YPMC 17.12.040). Under Chapter 19.04 Environmental Policy and Procedures, noise mitigation measures are noted as applicable to potential determination of non-significance on proposals under SEPA (YPMC 19.04.140).

King County

The King County Code (KCC) defines the maximum permissible environmental noise levels within rural, residential, commercial, and industrial districts for sound sources located within King County (KCC 12.86.110) (**Table 3.7-4**), along with permissible modifications (KCC 12.86.120). Due to the time-varying character of noise, a statistical noise descriptor called the equivalent continuous sound pressure level, or L_{eq}, is commonly used where the time period for the L_{eq} is specified. The L_{eq} is the equivalent sound level, the constant sound level in a given time that conveys the same sound energy as the actual time-varying, A-weighted sound. Sound level measurements are required to be based on the L_{eq} during the measurement interval, using a minimum measurement interval of 1 minute for a constant sound source or a 30-minute measurement for a noncontinuous sound source (KCC 12.86.110).

TABLE 3.7-4
MAXIMUM PERMISSIBLE SOUND LEVELS BY RECEIVING PROPERTY DISTRICT

District of Sound Source	District of Receiving Property			
	Rural (day/night) (dBA)*	Residential (day/night) (dBA)*	Commercial (dBA)	Industrial (dBA)
Rural	49/39	52/42	55	57
Residential	52/42	55/45	57	60
Commercial	55/45	57/47	60	65
Industrial	57/47	60/50	65	70

* Night hours are between 10:00 p.m. and 7:00 a.m. during weekdays and 10:00 p.m. and 9:00 p.m. on weekends.

Noise from construction activities for heavy equipment used on construction sites, including crawlers, tractors, bulldozers, rotary drills and augers, loaders, power shovels, cranes, derricks, graders, off-highway trucks, ditchers, trenchers, compactors, compressors, and other similar equipment, is allowed to exceed the maximum permissible sound levels between 7:00 a.m. and 7:00 p.m. on weekdays, and between the hours of 9:00 a.m. and 7:00 p.m. on weekends (KCC

12.86.520). Impact-type construction equipment, including pavement breakers, pile drivers, jackhammers, sandblasting tools, or other types of equipment or devices that create impulse noise or impact noise, are allowed to exceed maximum permissible sound levels between the hours of 8:00 a.m. and 5:00 p.m. on weekdays, and between 9:00 a.m. and 5:00 p.m. on weekends. For all other construction activities, operating hours are between 7:00 a.m. and 10:00 p.m. on weekdays and between 9:00 a.m. and 8:00 p.m. on weekends.

3.7.3 What are the existing noise conditions in the Plan area?

Sound levels for the Lake Washington neighborhoods in the Plan area are described below. Major noise sources generally include commercial areas and major roads. Sensitive receptors include residences, schools, hospitals, cultural and religious sites, and nursing homes. The LWWLL pump/lift stations may contribute slightly to local noise levels.

Most neighborhoods are single-family residential, interspersed with multi-family residential residences; a small portion of the Downtown Old Bellevue District is centrally located in the Plan area. Noise from SR-520 is audible in these neighborhoods, as is overhead airplane traffic. Noise from I-90 is likely audible in the southern neighborhoods, including Beaux Arts Village. In addition to residences, various natural heritage and cultural sites and schools, including Medina Elementary School, and the various parks along Lake Washington are noise-sensitive receptors. The area adjacent to Lake Washington includes a number of recreational facilities, including Wetherill Nature Preserve, Morningside Park, Fairweather Nature Preserve, Medina Beach Park, Viewpoint Park – Medina, Clyde Beach Park, Meydenbauer Beach Park, Wildwood Park, Chism Beach Park, Burrows Landing, and Chesterfield Beach Park, where natural, lower noise levels are important considerations for park visitors. Schools, libraries, hospitals, nursing homes, daycare centers, and other noise-sensitive receptors located within and adjacent to the Plan area are shown on **Figure 3.3-1.** Single-family residential and multi-family residential land uses are shown in **Figure 3.1-1** in Section 3.1.

3.8 Transportation

This section describes the existing transportation network and applicable policies, plans, and regulations for the Plan area and other potentially affected areas, and summarizes the existing transportation system, including roadways, parking, transit, and nonmotorized facilities, within the areas that could be affected by the Plan.

3.8.1 What are the relevant adopted plans, policies, and regulations?

This section describes federal, state, and local transportation plans and policies that are relevant to the Plan area. Each community in the Plan area has developed individual plans and policies for the transportation system within their jurisdiction.

Potential transportation impacts associated with the Plan would result primarily from construction. **Table 3.8-1** describes transportation standards and regulations related to construction within public road rights-of-way.

TABLE 3.8-1
REGULATIONS, GUIDELINES, AND PERMITS FOR TRANSPORTATION PROJECTS

Statute or Guideline	Lead Agency	Regulated Activities
Federal		
Manual on Uniform Traffic Control Devices (MUTCD)	Federal Highway Administration (FHWA)	Defines standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public travel. The MUTCD is a compilation of national standards for all traffic control devices, including road markings, highway signs, and traffic signals, that is updated periodically to accommodate the nation's changing transportation needs and address new safety technologies, traffic control tools, and traffic management techniques. The MUTCD includes standards for signs, flagging, and barricades in temporary construction work zones (FHWA 2009).
State of Washington		
Work Zone Traffic Control Guidelines	Washington State Department of Transportation (WSDOT)	WSDOT has jurisdiction over state highways and ramp intersections. Work conducted within the right-of-way of state highways must be coordinated with WSDOT. The WSDOT Work Zone Traffic Control Guidelines are based on the standards set forth in the MUTCD (WSDOT 2021).
Standard Specifications for Road, Bridge, and Municipal Construction	WSDOT	Establishes the temporary traffic control of all types of traffic, including vehicular and nonmotorized, to ensure proper safety and control measures, such as construction, warning and detour signs, and other traffic control devices (WSDOT 2023).
City of Bellevue		
City of Bellevue Transportation Department Design Manual	City of Bellevue Transportation Department	Establishes the requirements for the development of transportation-related facilities and designed to be utilized with projects that modify existing developments or City right-of-way. The manual states that temporary traffic control and construction zone signing, and barricades be utilized to ensure traffic safety during construction activities (City of Bellevue 2017).
City of Medina		
Medina City Council Meeting Minutes (September 13, 2010)	Medina City Council	Motion passed on September 13, 2010, by the Medina City Council to adopt the City of Bellevue Transportation Design Manual with authorization to the City Engineer to modify as necessary (City of Medina 2010).
Beaux Arts Village		
Beaux Arts Village Municipal Code	Beaux Arts Village Town Council	The Standard Specifications for Municipal Public Works Construction and Supplement No. 1 prepared by the Washington State Chapter of the American Public Works Association, published in 1977, is used as the engineering standard for regulating construction and maintenance of all public works, including streets, bridges, and structures in Beaux Arts Village (BAVMC 15.10).
Town of Hunts Point		
Town of Hunts Point Municipal Code	Town of Hunts Point Town Council	Establishes roadway design standards (HPMC 17.30), vehicle limitations on public rights-of-way within the town during construction (HPMC 10.10), and designates hours for parking construction-related vehicles and equipment (HPMC 10.15.020).

Statute or Guideline	Lead Agency	Regulated Activities
Town of Yarrow Point		
Town of Yarrow Point Municipal Code	Town of Yarrow Point Town Council	Establishes guidelines for construction activities (YPMC 12.30), including parking requirements, encroachment permit and agreement requirements (YPMC 12.24), and public street design requirements (YPMC 16.16).
King County		
2016 Road Design and Construction Standards	King County Department of Transportation Road Services Division	Outlines road design and construction standards for constructing or modifying road or right-of-way facilities. Traffic control follows the guidelines of the WSDOT Standard Specifications, and all signage, barricades, and flagging conform to the MUTCD Manual requirements.

3.8.2 What are the existing transportation characteristics of the Plan area?

This section characterizes the major transportation networks throughout the Lake Washington Wastewater Lake Line Management Plan area. The existing transportation system includes roadways, parking facilities, transit, water navigation, and nonmotorized facilities, described in the following sections.

Roadways

I-405 is the major north-south route through the east Lake Washington area, serving as an important commuter route and a major local, regional, and interstate truck route. I-90 and SR-520 are the major east-west routes, and each has a bridge that crosses over Lake Washington.

All roadways in the Plan area have designated functional classifications; the classifications relate to established development standards upon which street improvements are based. Below are the classifications given to the roadways within the Plan area by the City of Bellevue (City of Bellevue 2015):

- **Major Arterials** provide efficient direct routes for long-distance auto travel within the region, specifically between freeway interchanges to major concentrations of commercial activities.
- **Minor Arterials** provide connections between major arterials and concentrations of residential and commercial activities.
- **Collector Arterials** are two- or three-lane streets that collect (or distribute) traffic within a neighborhood and provide connections to minor or major arterials serving neighborhood traffic, typically in residential and commercial areas.
- **Local Streets** are designed primarily to provide access to abutting land uses and carry local traffic to collector arterials.

Some roads in the southern portion of the Plan area are designated as private roadways that are not publicly maintained. The private streets include the south end of Lakehurst Lane south of

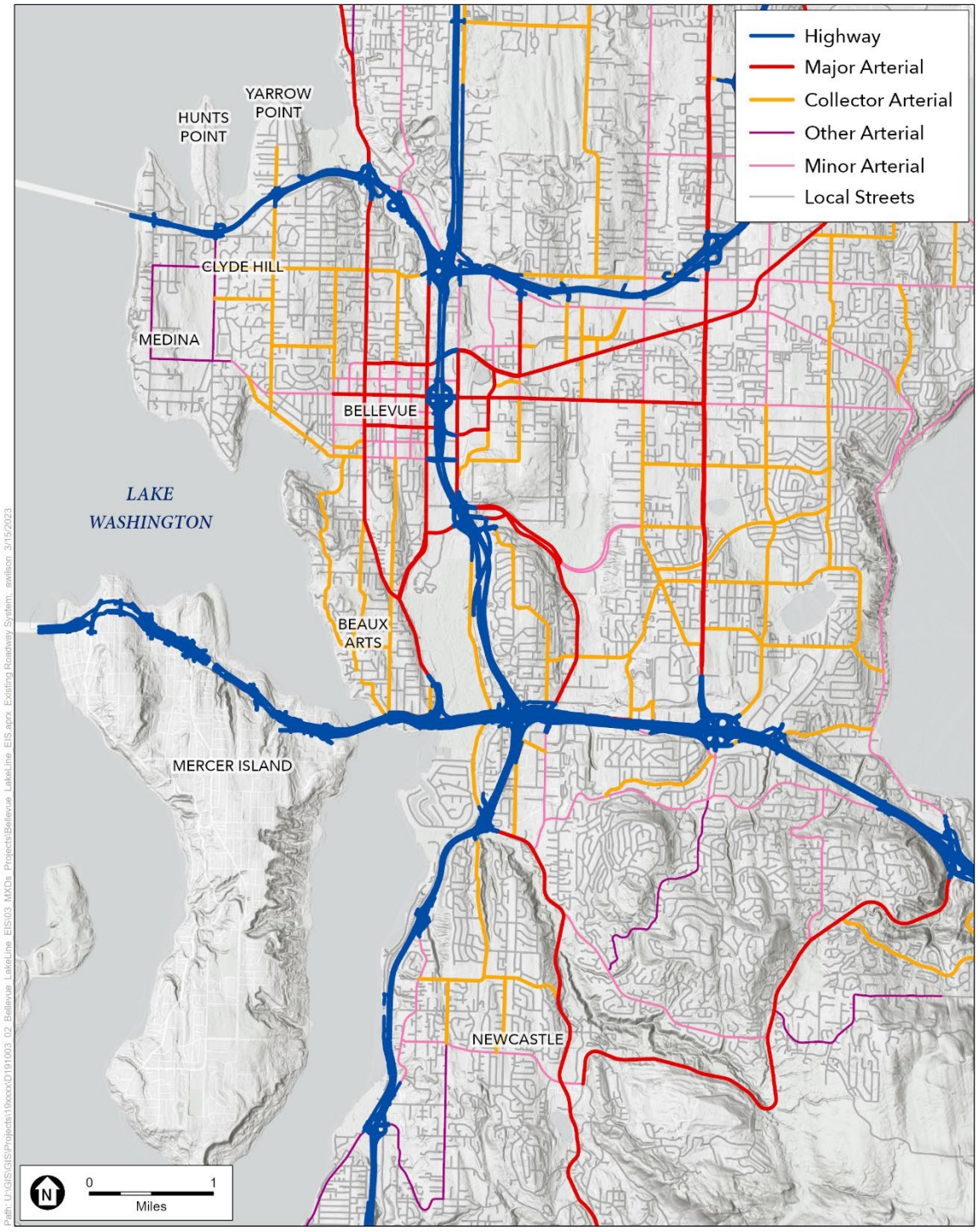
approximately 5007 Lakehurst Lane, Pleasure Point Lane SE, Hazelwood Lane SE, and Ripley Lane SE, all located west of I-405 and adjacent to the shoreline. **Figure 3.8-1** shows the eastern Lake Washington roadway system and highlights the freeways, arterials, and collectors that serve the Plan area.

Parking

Parking is limited in the neighborhoods adjacent to Lake Washington; however, a few roadways in the Plan area do allow parking along the street in designated areas, such as portions of Evergreen Point Road in Medina and Lake Washington Boulevard and 101st Avenue SE in Bellevue. The adjacent recreational facilities also have dedicated parking. Around Downtown Bellevue, the parking is managed with Residential Parking Zones (RPZ), which are areas established by the City ordinance, with support from neighborhood residents and Bellevue City Council approval, to restrict non-residential parking on neighborhood streets (see **Figure 3.8-1**). Exemptions to the restriction only apply to residents and their guests who are parked legally and display an RPZ permit (City of Bellevue 2022). A park-and-ride at the Evergreen Point Bridge is also located in the Plan area along high-occupancy vehicle lanes on SR-520 and bus routes.

Transit

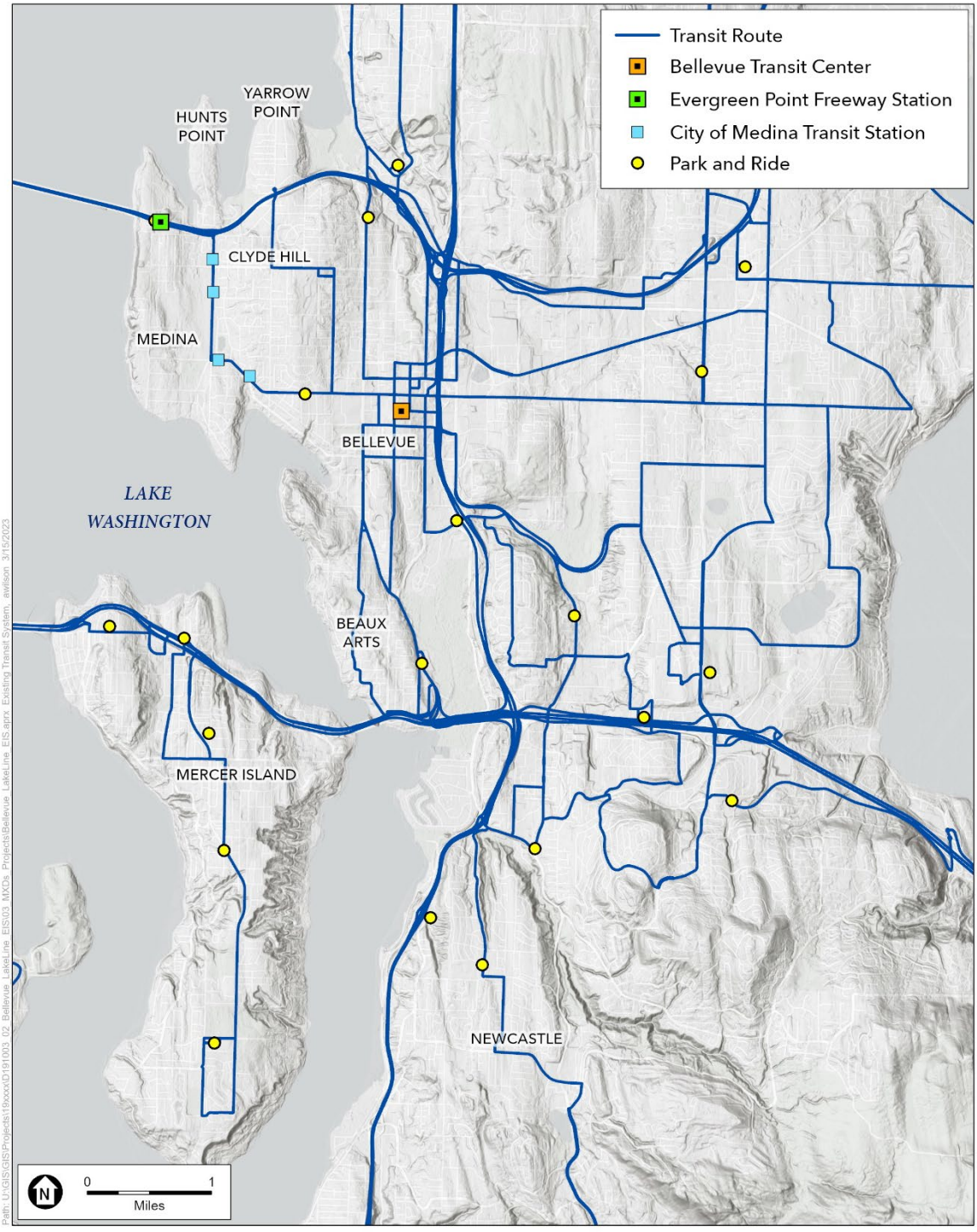
Transit service in the Plan area is provided by King County Metro and Sound Transit. The Issaquah Highlands – Bellevue – University District and Redmond – University District Priority Bus (Frequent Express) Corridors both utilize the SR-520 bridge over Lake Washington from Overlake Village. Frequent Transit Network reflects all-day routes that operate headways of 15 minutes or better during the peak and 30 minutes or better off peak. Routes 167, 242, 243, 250, 265, 540, 555, and 556 utilize the Evergreen Point Freeway Station and pass through the Plan area along SR-520 (City of Bellevue 2014). Bus route 271 provides direct service to Medina residents along 84th Avenue NE (City of Medina 2015). **Figure 3.8-2** illustrates transit service in the Plan area.



Sources: Roads: City of Bellevue 2023

Bellevue Lake Line EIS

Figure 3.8-1
Existing Roadway System in the Plan Area



Sources: Transit Routes: King County 2023; Park and Rides: King County 2017

Bellevue Lake Line EIS

Figure 3.8-2
Existing Transit in the Plan Area

Water Navigation

Lake Washington is a navigable water of the U.S. in Washington State as defined by the Corps as *"waters that are subject to the ebb and flow of the tide and/or are presently used, have been used in the past or could be used to transport interstate or foreign commerce"* (Corps 2020). In addition to commercial uses, Lake Washington is used by recreational boaters.

Nonmotorized Facilities

Nonmotorized facilities, such as sidewalks, bicycle facilities, and trail facilities, are located throughout the Plan area. Signalized intersections include marked crosswalks with pedestrian signals. All intersections that do not have marked crosswalks are still considered to be legal pedestrian crossings. In addition to sidewalks, nonmotorized facilities in the Plan area include multi-purpose paths, bicycle lanes on either one side or both sides of the street, bicycle shoulders or shared shoulder, wide outside lanes, and roadway lanes that are marked with "sharrows" indicating that motorists should share the lane with bicyclists (City of Bellevue 2015). **Figure 3.8-3** shows the major bicycle and pedestrian facilities that serve the Plan area.

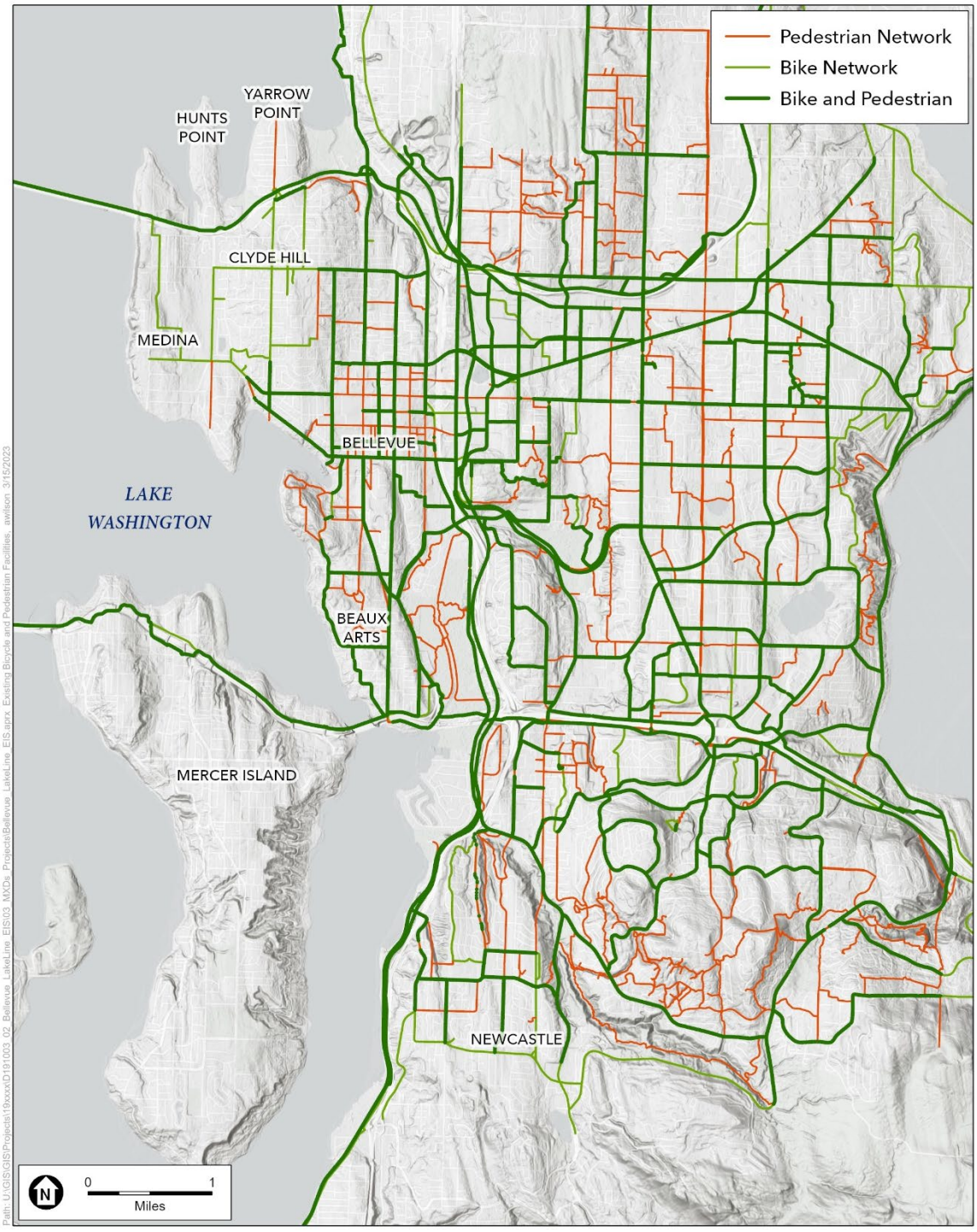
Neighborhoods that consist primarily of low-density residential or commercial development typically have less nonmotorized activity. However, since local streets tend to have less traffic than other roadway classifications, pedestrian and bicycle traffic may increase on local streets as people choose these modes of travel as the roads feel safer.

3.8.3 What transportation facilities are present in each Plan neighborhood?

Lake Washington Neighborhoods

The primary transportation facilities within the Lake Washington neighborhoods are local roadways. These areas generally experience lower levels of traffic as compared to the other roadways. The Lake Washington neighborhoods are served by two major west-east routes that connect the neighborhoods via nonmotorized (bicycle and pedestrian) and vehicular (automobile and transit) travel to either side of Lake Washington. Most arterial roadways directly adjacent to the Lake Washington waterfront are classified as collector arterials, although a few minor and major arterials exist nearby (City of Bellevue 2022).

One major transportation construction project is currently occurring in the southern Lake Washington neighborhoods: East Link Light Rail construction. **Table 3.8-2** summarizes transportation characteristics in the Plan area neighborhoods.



Sources: Bike and Pedestrian Networks: City of Bellevue 2023

Bellevue Lake Line EIS

Figure 3.8-3
Existing Bicycle and Pedestrian Facilities in the Plan Area

TABLE 3.8-2
LAKE WASHINGTON NEIGHBORHOODS TRANSPORTATION CHARACTERISTICS

Facilities	Transportation Characteristics
Roadways	Area is primarily local roadways, with the following roadways with higher traffic volumes: • Major North-South Route (east of Plan area): I-405. • Major West- East Routes: I-90 and SR-520. • Minor Arterials: 84th Avenue NE, Main Street, NE 8th Street and NE 12th Street, 100th Avenue NE, and NE 4th Street. • Collector arterials: Evergreen Point Road, 92nd Avenue NE, NE 24th Street, NE 20th Street, Lake Washington Boulevard NE, Killarney Way/1000th Avenue SE, 104th Avenue SE, Hunts Point Road, 106th Avenue SE, and NE 12th Street, Overlake Drive W.
Bridges	• East Channel Bridge carrying I-90 and the I-90 trail (Mountains to Sound Greenway Trail) across Lake Washington. • Evergreen Point Floating Bridge carrying SR-520 and the 520 trail across Lake Washington.
Parking	Primarily local parking or on-street parking with additional options and restrictions: • Park and Ride locations: – Evergreen Point Bridge, includes BikeLink: Evergreen Park and Ride (parking for approximately 50 vehicles). – South Bellevue Park and Ride. • Downtown Bellevue Parking: – Residential Parking Zone 9 located west of Downtown Park. – Time-restricted parking restrictions, including 2-hour parking zones between 7:00 a.m. and 6:00 p.m. except on Sundays and holidays. – 15-minute loading zone parking restrictions on Main Street and others.
Transit	Bus Routes: • Highest concentration near the Bellevue Transit Center. • Evergreen Point Freeway Station (direct access to 15 bus routes).
Railroads	None
Navigable Waters	Lake Washington
Nonmotorized Facilities	Key bicycle and pedestrian infrastructure: • Facilities adjacent to and within Downtown Bellevue. • Bike routes along urban minor arterials (e.g., Wetherill Nature Preserve to Downtown Bellevue on 84th Avenue NE) and collectors (e.g., Evergreen Point Road) providing connections. • I-90 trail (Mountains to Sound Greenway Trail), East Rail Trail, Points Loop Trail and 520 trail.

3.9 Cultural Resources

This section describes the existing known cultural resources and applicable policies, plans, and regulations for the Plan area and other potentially affected areas.

3.9.1 Definition of cultural resources and regulatory context

Cultural resources are evaluated under different regulations depending on funding, permitting, and land ownership. These federal, state, and local regulations are summarized in **Table 3.9-1.**

TABLE 3.9-1
REGULATIONS AND PERMITS FOR HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

Statute	Lead Agency	Regulated Activities
Federal		
National Historic Preservation Act, Section 106 of 16 U.S. Code 470s	Funding or permitting agency	Requires lead federal agency to *"take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register."* The lead federal agency will require the proponent to identify historic properties that may be potentially affected, assess the effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties.
State of Washington		
State Environmental Policy Act (SEPA)	Ecology	Requires that cultural resources within a proposed project area must be identified, and that measures must be proposed to reduce or control impacts on these resources. Under SEPA, the Department of Archaeology and Historic Preservation (DAHP) provides formal opinions on the significance of sites and the impact of proposed projects on such sites.
Indian Graves and Records (RCW 27.44), Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60), Archaeological Sites and Resources (RCW 27.53), and Discovery of Human Remains (RCW 27.44)	DAHP	These laws contain clauses regarding the inadvertent discovery of cultural resources or human remains during activities such as construction.
Executive Order 21-02	DAHP	Establishes a review process by DAHP and affected tribes for state-funded capital or land acquisition.

Historic resources are generally not considered eligible for listing in the National Register of Historic Places (NRHP) until they are 50 years old. Because construction of projects implemented under the Plan is not anticipated until 2026 at the earliest, this means that resources older than 1976 would potentially be eligible for listing.

3.9.2 What is the history of the area?

Environmental History Overview

The Plan area is primarily located along the shorelines of Lake Washington, which occupies a north-south elongated trough that was carved between approximately 17,400 and 16,400 years ago during the Vashon stade of the Fraser glaciation (Booth 1994). As the Vashon lobe of the Cordilleran ice sheet advanced and retreated during this time interval, meltwater and ice scoured through older glacial drift deposits (Troost 2011). Water and sediment accumulated in the trough as the glacial ice continued to retreat. During progradation and stagnation, the resulting sediment deposition consisted of vast quantities of diamict till, a poorly sorted mixture of glacial clay, silt, sand, and gravel; till deposits tend to appear gray to blue and are usually extremely compact.

Lake Washington rapidly filled by about 14,500 years ago, after which it continued to rise slowly until 1916 when the lake level was abruptly and permanently lowered over several months by approximately 9 feet after opening of the Montlake Cut to complete the Lake Washington Ship

Canal (Troost 2011). This exposed formerly inundated areas along the shoreline, leaving approximately 9- to 10-foot-high exposures above the pre-1916 waterline. At present, the lake level, which averages around 18 to 19 feet above mean sea level, is kept within a 2-foot range, and is controlled by a dam at the Hiram M. Chittenden Locks at the west end of the Lake Washington Ship Canal (Troost 2011).

Through the late 1950s, municipalities surrounding Lake Washington and Puget Sound dumped raw or inadequately treated sewage directly into the lake, resulting in significant algae growth and other bacterial contamination. By 1958, the lake was declared unsafe for swimming and 20 million gallons of sewage was emptied into the lake every day (EPA 1972:2; Wilma 2000). To address the issue, a single governmental entity, Metro, was established and engineers constructed four wastewater treatment plants, *"more than 100 miles of large tunnels and interceptor sewers, and dozens of pumping stations"* along the lake, as well as connecting existing treatment plants (Wilma 2000). Construction took nearly a decade and cost $140 million, and at the time *"was considered the most costly pollution control effort in the country"* (King County 2016). The last plant discharging sewage into the lake was closed in 1968, and the water quality rapidly improved (Wilma 2000). By 1972, Lake Washington beaches were open again and the lake's health continued to improve over the following decades, and by 1993 the quality was better than it had been in 1950 (EPA 1972; King County 2016).

Archaeological Overview

The precontact cultural chronology of the Pacific Northwest and Puget Sound from the Late Pleistocene onward has been previously summarized (Ames and Maschner 1999; Blukis Onat et al. 2001; Kidd 1964; Kopperl et al. 2016; Matson and Coupland 1995; Nelson 1990). The various chronologies generally agree on broad patterns in culture but may differ regarding the timing and significance of changes in specific aspects of culture, such as subsistence, technology, and social organization. The following discussion of cultural-historical sequence draws broadly on the various chronologies. A five-period timeline is summarized in **Table 3.9-2** below based on Ames and Maschner (1999) and the King County Analytic Periods discussed in Kopperl et al. (2016). Settlement in present-day King County began over 12,000 years ago with one of the oldest sites (45KI839) in Washington State, located between 5 and 6 miles northeast of the Plan area at Bear Creek.

Approximately 5 miles northeast of Yarrow Point is an area known as the Bear Creek Site (45KI839), which contains a variety of artifacts that are estimated to date from approximately 12,000–10,000 cal BP (dating from the Late Pleistocene-Holocene transition) and is one of the oldest sites on the Pacific Coast of North America (Kopperl et al. 2016:ii-iii). It is located at the confluence of Bear Creek and the Sammamish River. The people who used the site were likely a relatively small group of subsistence foragers who moved in a "*structured redundant pattern of movement*" and revisited the site on a fairly regular basis (Kopperl et al. 2016:246, 248, 251). They utilized boats, although it appears to be general consensus they were not fully maritime. While specific details about the site are mostly speculative, there are indications they processed salmon (Kopperl et al. 2016:238-240, 242). Most of the identified tools were versatile, and it is clear the site was used for "*the procurement of lithic raw materials and the manufacture and maintenance of tools"* (Kopperl et al. 2016:248). Additionally, approximately 0.5 mile south of

the Bear Creek Site is the Marymoor Site (45KI9), which is located on the Sammamish River near the present-day Marymoor Park. The site was excavated in 1964 and was one of the first excavations of a precontact-era site in western Washington; it dates to as early as 1750 cal BP (Kopperl et al. 2016:32; Bixby 1969: Section 8). Additional archaeological sites have been recorded throughout Marymoor Park since this time. Cumulatively, sites in the area demonstrate long-term and repeated use of the region, as well as the presence of historic-era archaeological resources.

TABLE 3.9-2
PRECONTACT PERIODS (KOPPERL ET AL. 2016)

Period	King County Analytic Period (AP)	Approx. Date Range	Characteristics
Late Pacific	5	2,500 cal BP – 200 cal BP	Represented by seasonal camps associated with resource procurement and increased variability in burial methods. Site types include winter villages, base camps, field camps, resource gathering sites for hunting, fishing, plants, and quarry sources.
Middle Pacific	4	5,000 cal BP – 2,500 cal BP	Represented by large plank houses, increase in decorative items, woodworking tools (adzes, mauls, wedges). Site types include possible villages, base camps, field camps, resource gathering sites for hunting, fishing, plants, and quarry sources.
Early Pacific	3	8,000 cal BP – 5,000 cal BP	Located in marine and estuary settings; represented by large shell middens and decorative artifacts such as labrets and bracelets. Site types include base camps, field camps, and various resource gathering and non-residential sites.
Archaic	2	12,000 cal BP – 8,000 cal BP	Often referred to as Olcott culture and located in riverine and lake settings; represented by cobble tools and lanceolate projectile points. Site types include small residential base camps, field camps, resource gathering, and quarry sites.
Paleoindian	1	14,000 cal BP – 12,000 cal BP	Often referred to as Clovis culture, represented by projectile points. This period represents post-glacial entry of humans into the Puget Sound basin. Site types include small residential base camps, resource gathering near those camps, and isolate finds.

Precontact Cultural Context

Tribes hold complete knowledge of their history. The following section has been prepared based on published materials written by tribes and by non-Native people from the 19th, 20th, and 21st centuries. Materials prepared by non-Native people often do not present the full and accurate understanding of tribal history and knowledge. The authors acknowledge that these sources inherently contain deficiencies, and use of them is not intended to substitute or supersede historic knowledge held within the tribe.

Broadly speaking, the Plan area is in the traditional territories of the Southern Coast Salish people, who share many traditional cultural practices and language (Lane 1975; Miller 2014; Snoqualmie Indian Tribe 2020; Suttles and Lane 1990:485). Oral traditions support the presence of Southern Coast Salish people in this portion of Puget Sound since time immemorial, and this is also supported by archaeological evidence within the region (Kopperl et al. 2016; Duwamish Tribe 2018). Moreover, the Plan area is located within the ancestral lands of the signatories of the 1855 Treaty of Point Elliott (Marino 1990). Signatories included but are not limited to the

Duwamish *dxʷdəwʔabš* (people of the inside) and Upper Puyallup (members of today's Muckleshoot Indian Tribe), Suquamish, and Snoqualmie people (Muckleshoot Indian Tribe 2022; Snoqualmie Indian Tribe 2020; Suquamish Tribe 2015). Signatories of this treaty are part of a larger shared Southern Coast Salish culture group who share a common dialect of the Southern Lushootseed language (Lane 1975, 1988; Suttles and Lane 1990). Descendants of the Duwamish at the time of the treaty are members of today's non-federally recognized Duwamish Tribe and the following federally recognized tribes: Snoqualmie Indian Tribe, Suquamish Tribe, Tulalip Tribes, Muckleshoot Indian Tribe, and Confederated Bands and Tribes of the Yakama Nation, along with additional Coast Salish tribes through intermarriage (Miller and Blukis Onat 2004; Tulalip Tribes 2016).

Prior to the arrival of non-Native people to the region, the Southern Coast Salish peoples in what is now King County traditionally shared a general settlement pattern based on permanent residency in winter villages and travel in the spring, summer, and fall to other locations for resource acquisition and preparation (Kopperl et al. 2016). Settlement patterns were already changing at the time of contact with non-Native people as a consequence of disease epidemics that decimated Native American populations (Boyd 1990). Following the Treaty of Point Elliott in 1855, Native settlement was no longer self-determined, as access to traditional lands became increasingly restricted (Marino 1990). Although the traditional structural organization of village sites varies from tribe to tribe, village settlements were generally located in areas along major waterways and at the heads of bays or inlets containing an abundant and reliable supply of coastal and estuarine resources (Baldwin et al. 2021; Kopperl et al. 2016; Thrush 2007; Waterman 1922).

Typical fishing methods for creeks include weirs and willow and stone traps (Greengo and Houston 1970; Suttles and Lane 1990). According to Suttles and Lane (1990), vegetable foods, such as imported bracken, camas, and wapato, were common among the Southern Coast Salish by contrast to other Pacific coast tribes. Traditional food processing methods utilize a variety of stone, bone, antler, and wooden tools. Cedar bark is a key resource in traditional cultural practices and is used in a variety of ways for traditional clothing, mats, blankets, and rope (Suttles and Lane 1990). Typical hunting methods were dependent upon the type of animal and season but are generally reflected in the archaeological record by the presence of stone tools, bone tools, and stacked rock features used as windbreaks or hunting blinds (Hedlund et al. 1978; Kopperl et al. 2016).

Post-Contact Cultural Context

In the mid- to late-1800s, white settlers slowly began claiming land on the east side of Lake Washington. The area remained relatively undeveloped and was primarily dedicated to logging, with small orchards and berry and truck farms. Much of this work was done by Japanese immigrants who did *"what white residents had moved away from: they did the back-breaking work of clearing the large and deeply rooted stumps and made Bellevue suitable for farming and homes*" (Marsha 2017). Near the turn of the century, most of the old-growth trees had been logged (Eastside Heritage Center 2006:41). The area remained rural through the first half of the 20th century with a population of just 400 in 1900 (Stein 1998). Lake Washington Boulevard, connecting the east and west sides of Lake Washington, was completed in 1920 (Goetz 2006:2-8). Car and passenger ferries also offered service across the lake and ran from Medina to Leschi Park

(LeWarne 1997). Plans for a bridge across Lake Washington began as early as 1926, although construction did not begin until 1939, and in 1940 the four-lane I-90 opened (Jones and Stokes 2005:5; LeWarne 1997).

In 1924, Bellevue was described as "*a town on Meydenbauer Bay six and a half miles east of [Seattle's] Pioneer Square, a banking and shipping point with four churches, telephones, railway express, and 16 daily boats to Leschi Park"* (J. Kingston Pierce in Berger 2013). Many of the farms were owned and operated by Japanese Americans. By the 1930s approximately three-fourths of all produce in the region was grown on Japanese and Japanese American farms (Marsha 2017). Following the attack on Pearl Harbor, President Roosevelt signed Executive Order 9066, which forcibly removed more than 100,000 people of Japanese ancestry on the West Coast to concentration camps for the duration of the war. Sixty Bellevue families were removed. Some had neighbors who helped maintain their farms, but most were forced to sell their land for far less than it was worth. After Executive Order 9066 went into effect, "… *Eastside businessmen […] began the suburban and urban development that has built the city to what we know today. With the farmers forced out, the cleared farmland became available for upscale shopping centers and housing developments made accessible with new highways*" (Marsha 2017). When families returned after the war (only 11 of the 60 returned at all), those who still owned land faced sabotaged wells, burned property, and finances too meager to purchase equipment.

The Lake Washington Floating Bridge, constructed in 1940, brought some development pressure to the area, which was only heightened with the end of World War II. The area swiftly transitioned from an agricultural center to a bedroom community for Seattle (Clutter and Balter 1991; Rinck 207:13). Development continued to intensify after construction of the Evergreen Point Floating Bridge across Lake Washington in 1963, as well as completion of SR-520, I-405, and the Microsoft campus in the 1980s (Rinck 2017:13). By 1960, Bellevue's population had reached 12,800 but just a decade later stood at 61,200, and several large suburban developments were constructed in the post-war era, including an 80-acre development known as Vuecrest on former Japanese American land and the 12,000-acre Lake Hills development that eventually consisted of approximately 4,000 houses (LeWarne 1997; McDonald 2000:157).

Service Area Neighborhoods

Described below are the cultural resources for the Plan area, divided by the six Service Areas and the "neighborhoods" contained within them, as depicted on **Figure 3.1-1**.

Yarrow Point Neighborhood

The first land patent in what is now Yarrow Point was issued to Wilber W. Easter on July 20, 1886 for most of the point, and non-Indigenous settlement of the area began around that time (U.S. Bureau of Land Management 1977). Yarrow Point is shown further subdivided into several smaller plat lots with roads, and Yarrow Wharf in place by 1907 (Anderson Map Company 1907; Valentine 1907). In the first half of the 20th century, Yarrow Point had several cabins and smaller residences; settlement was focused around farming and enjoying the benefits of a more rural life just beyond Seattle and eastside development (Knauss 2003). Edward Tremper held a large farm of imported English holly at Yarrow, and several Japanese worked portions of and leased farming

land from him (Knauss 2003). The Yarrow Point community, aiming to retain their natural setting and some control from encroaching development, incorporated in 1959 (Dougherty 2015b). In 1988, Marjorie and Sidonia Wetherill donated their family's large estate, creating the Wetherill Nature Preserve (Knauss 2003). Historic aerial photography from the late 20th century shows little change within Yarrow Point beyond new residences and associated recreational facilities (NETROnline 2022).

Hunts Point Neighborhood

Although he never lived in the neighborhood, Hunts Point is named for Leigh S.J. Hunt, publisher of the Seattle Post-Intelligencer from 1886 to 1894, who lived on the adjacent Yarrow Point. In the early 1870s, he purchased portions of Hunts Point, purportedly to clear land obstructing his view and later renamed it after himself (Dougherty 2015b; Phillips 1972:64). Following a downturn in Hunt's investments during the financial panic of 1893, several Seattle businessmen purchased the land, using it for picnics and camping (Town of Hunts Point 2022). Early structures built at Hunts Point were small summer cottages until electricity, phones, a post office, and a school all arrived by about 1910 (Dougherty 2015a; Town of Hunts Point 2022). The primary road, Hunts Point Road, was originally a gravel road constructed in 1905, with improvements and extensions through the years until 1938 (Dougherty 2015a). The area continued to be a farming community through at least 1931 (Eastside Heritage Center 2006:66). Growth throughout the Eastside boomed following the opening of the Lake Washington Floating Bridge in 1940. This encroaching development, in addition to Bellevue's perceived interest in annexing surrounding areas (the City incorporated in 1953), prompted a push for incorporation, which occurred on August 26, 1955 (Dougherty 2015a; Town of Hunts Point 2022). Limited to large lot sizes, Hunts Point was largely developed by the end of the 1960s and has seen few subsequent changes (NETROnline 2022).

Medina South & Evergreen Point Neighborhoods

Thomas Dabney is considered the first non-Indigenous settler in what is now Medina. He arrived in 1886 and claimed land along Lake Washington, and by 1890 or 1891 had built a ferry landing that became the main Eastside landing for people arriving from Seattle (Dougherty 2015c; City of Medina 2016). Some members of the community were farmers – mostly growing berries – while other residents kept smaller farms or gardens that they tended to in the evenings and weekends. Community members who were not professional farmers typically commuted to Seattle by ferry or rowboat. By the early 20th century, several began selling their produce at Pike Place Market (City of Medina 2016). Medina was platted in February 1914, by which time it had a grocery store, post office, and school. Just 6 weeks later, a ferry began service that connected Medina to Seattle's Leschi Park (Dougherty 2015c). The area attracted wealthy Seattleites during the 1920s, many of whom built extravagant mansions, although at least one included orchards and livestock on the grounds (Cornwall 2002).

The Lake Washington Floating Bridge opened Medina and its surrounding neighborhoods to additional growth, and it largely replaced the ferry system to the eastside. The last Leschi Park – Medina ferry ran the day before the bridge opened, although a smaller ferry on the east side of Evergreen Point (at Fairweather Bay) continued until 1945 (Dougherty 2015c). Following its incorporation in 1953, Bellevue expressed an interest in annexing surrounding neighborhoods.

Wanting to stay separate, Medina incorporated on August 19, 1955. Early proposals included Yarrow, Hunts, and Evergreen Points within Medina, but ultimately only Evergreen Point became a part of the city (Dougherty 2015a). It was clear by the 1950s that the Lake Washington Floating Bridge was insufficient for the amount of traffic, and a second bridge, connecting Evergreen Point to Seattle's Montlake neighborhood, was planned and completed in 1963. More commonly known as the SR-520 Bridge, it separated Evergreen Point from the rest of the city. Until this point, the city had remained relatively undeveloped (supported by large lot requirements ranging from 16,000–30,000 square feet), but grew significantly through the end of the 1970s, at which time it stabilized (Dougherty 2015c; NETROnline 2022).

Meydenbauer Bay Neighborhood

Meydenbauer Bay is named for William Meydenbauer, one of the first non-Indigenous settlers on the eastside. He built a cabin on the bay that now bears his name in March 1869, but only remained long enough to claim a homestead and receive the land title; shortly thereafter, he sold his holdings and moved to Hunts Point (Eastside Heritage Center 2019). The area was slowly developed, and a wharf was constructed in the 1880s. Near the turn of the century, a dance hall was constructed near the south end of the bay and hosted picnics, canoeing, swimming, picnics, roller skating, and boxing matches. It served those on both the east and west sides of the lake for decades and following World War II became the Meydenbauer Bay Yacht Club (Eastside Heritage Center 2006:121, 2019; Pappas 2019; Meydenbauer Bay Yacht Club 2022).

The 1900 census recorded just 400 people living in the larger Bellevue area, with one-quarter living in Meydenbauer Bay, although the population tripled by the following decade (Stein 1998). Logging was a profitable venture, and by ca.1902 most of the existing timber around the bay had been logged (Eastside Heritage Center 2006:41). In 1919, the head of the American Pacific Whaling Fleet, William Schupp, moved the boats from Grays Harbor County to Meydenbauer Bay, where they stayed during the winter (Alicea 2017; Eastside Heritage Center 2019; Stein 1998). The entry of the United States into World War II in 1941 put a halt to this, as the Navy took possession of both the docks and the boats for the war effort (Alicea 2017). Following the war, the bay saw residential development, and it was mostly built out by 1964, the year after the Lake Washington Floating Bridge (the 520 Bridge) opened (Eastside Heritage Center 2019; NETROnline 2022).

Killarney Neighborhood

By 1900, there were 100 people living in what is now known as Killarney (also identified as West Bellevue), which represented approximately one-quarter of the population of the Bellevue area (City of Bellevue 2022a; Stein 1998). Killarney remained largely undeveloped, save for agriculture, through the mid-1930s, with the exception of the Village of Beaux Arts (see below; NETROnline 2022). Like the rest of Bellevue and surrounding municipalities, development pressure began following the opening of the Lake Washington Floating Bridge in 1940, which is located directly south of the Killarney neighborhood, and increased with the opening of the 520 Bridge in 1963. Officially, Killarney was developed as a post-war subdivision (McDonald 2000:12). By 1964, the neighborhood had largely been developed (NETROnline 2022).

Village of Beaux Arts

Located within the larger Killarney neighborhood, at the lake line "Killarney PS" location, is an area known as the Village of Beaux Arts. It was established in 1908 as an artist's colony by Frank Calvert, Alfred Renfro, and Finn Frolich, and was one of the city's first residential communities (*Seattle Times* 2003; Town of Beaux Arts Village 2022). Residents embraced the Arts and Crafts movement of the time, which emphasized handmade articles in the face of increasing mechanization (Eastside Heritage Center 2006:26; Obniski 2008; Stein 1998). Titles to the community sold quickly, but few moved in, perhaps due to the lack of amenities – water needed to be hauled from the lake, and there was no electricity, phone lines, or grocery stores (Dougherty 2016; Town of Beaux Arts Village 2022). By 1916, only 15 people lived in the community, and an additional 63 held titles to land (Dougherty 2016; Town of Beaux Arts Village 2022). The full extent of the project, which included studios for, among other things, weaving, photography, sculpture, and metalwork, was never realized, due in part to the forfeiture of a portion of the land (intended to be a community square) during the Great Depression; it was subsequently divided and sold as homesites (Stein 1998; Town of Beaux Arts Village 2022). Wanting to stay independent, the community tried to incorporate in 1952, but was just shy of the required population of 300. A concerted effort to increase the population followed, and it incorporated two years later with a population of 304 (Town of Beaux Arts Village 2022). The Beaux Arts neighborhood was eventually annexed in the 1980s (City of Bellevue 2012).

Newport South Neighborhood

The City of Bellevue characterizes the early Newport South neighborhood as *"a secluded area of woods and wetlands*"; like most of the Bellevue area, it was heavily wooded prior to the arrival of white settlers near the end of the 19th century (City of Bellevue 2022b; Stein 1998). Newport was connected to Bellevue by a road in 1919 (McDonald 2000:101). By 1964, most of the waterfront had been developed and large mid-century suburban developments constructed in the northern and eastern sections of the neighborhood, although some land to the east of I-405 and farther south remained relatively undeveloped (NETROnline 2022). By ca.1980, construction began to move west, closer to I-405, in earnest for the following decade, with subsequent building tapering off as most vacant land vanished after the turn of the century (NETROnline 2022).

3.9.3 What is the study area for cultural resources?

The study area for cultural resources for the Plan area is divided by the six Service Areas and the "neighborhoods" contained within them, depicted on **Figure 3.1-1.** The Management Plan team reviewed the state cultural resources database (the Washington Information System for Architectural and Archeological Records Data, or WISAARD) for each Plan area neighborhood in October 2022 to assess the presence of historic resources (defined as buildings, structures, objects, sites, or districts 50 years of age or older), historic properties (historic resources that are listed in or have been determined eligible for listing in the National Register of Historic Places [NRHP], Washington Heritage Register [WHR], or as designated King County Landmarks), recorded archaeological and historic sites, cemeteries (including municipal cemeteries, historic/inactive cemeteries, and individual historic and Native American gravesites) (DAHP 2022). The Management Plan team also reviewed the Washington Statewide Archaeological Predictive Model, as well as the King County Predictive Model (DAHP 2010; Kopperl et al.

2016). These models were both developed to identify potential locations of unknown buried precontact (or prehistoric) cultural resources.

The Statewide Predictive Model classifies most of the Plan area as having a High to Very High Risk for containing precontact archaeological resources. Prior to any development in High to Very High probability areas, cultural resources surveys are highly advised by DAHP. The King County Predictive Model identifies the Plan area as having a low sensitivity for Analytic Period (AP) 1; moderate sensitivity for AP 2 and AP 3; a low sensitivity for AP 4 and AP 5; and a moderate to moderately high sensitivity for archaeological sites overall (Kopperl et al. 2016).

3.9.4 Previous Cultural Resources Work in the Plan Area

All of the Plan area neighborhoods were developed more than 50 years ago, and all contain numerous historic resources. However, not all of these are historically significant and many of them have not been evaluated. Two historic properties have been identified within the Plan area. Both are in the Medina South neighborhood. The James G. Eddy House (45KI173) is listed in the NRHP and WHR. The Old Ferry Dock Building is listed in the WHR. No King County Landmarks have been identified within the Plan area.

There are no recorded archaeological resources or traditional cultural properties within the Plan area (DAHP 2022). The nearest historic-era archaeological resource is the Historic Lake Washington Boulevard (45KI945), located approximately 0.3 mile southeast of the Hunts Point & Yarrow Point Service Area. This historic road was opened in 1922. The site includes a segment still in use as a roadway and an abandoned segment used as a recreational path and utilities access road (Jordan et al. 2009). The nearest precontact-era archaeological resource is 45KI1217, a multi-component site located approximately 0.7 mile east of the Killarney Service Area, east of Beaux Arts Village along the Mercer Slough. It contained a precontact lithic scatter and fire-modified rock (FMR). No diagnostic artifacts were recorded and no dates for the site exist at this time (Lothrop and Hoyt 2014).

No cemeteries are recorded within the Plan area, although there are ethnographic accounts of possible Indigenous burial grounds located at Yarrow Point, Meydenbauer Bay, and Pleasure Point (Buerge 1984; Blukis Onat et al. 2005).

Cultural Resources Assessments

Twenty-two prior cultural resources assessments have been conducted within the Plan area (Appendix C, Table C-1). No archaeological resources were identified within the Plan area; however, six surveys identified historic built environment resources within the Plan area, including residences and features of historic railroad lines (CH2M Hill and ICF Jones & Stokes 2009; ESA 2015; Gray 2008; Gray et al. 2011; ICF 2021; Ives et al. 2016). These surveys were completed for road and bridge improvements, drainage improvements, shoreline and stream restoration, and residential development.

Built Environment Resources

Within the Plan area, 80 historic built environment resources have been recorded in WISAARD (Appendix C, Table C-2). The James G. Eddy House and Grounds (45KI173) is listed in the NRHP and WHR, and the Old Ferry Dock Building in Medina (45KI172) is listed in the WHR. Of the remaining 78 recorded properties, three have been determined eligible for listing in the NRHP, 25 have been determined not eligible for listing, and 50 have not been evaluated for listing. An additional 339 resources have been documented within the Plan area using information derived from the King County Assessor (DAHP 2022). These resources, however, have not undergone intensive-level recordation, nor have they been evaluated for their NRHP eligibility.

3.9.5 What cultural resources are likely to be located within the Plan Area?

The following sections describe archaeological probability across the Plan area by Service Area. The recommendations provided below are informed by environmental conditions, documented historic and modern disturbance episodes, and recommendations provided by the Statewide Archaeological Predictive Model (DAHP 2010) and the King County Predictive Model (Kopperl et al. 2016).

The Statewide Predictive Model is a tool used by archaeologists and planners to evaluate potential archaeological risks on a broad scale. The model was developed to statistically evaluate multiple environmental factors (such as elevation, slope percent, aspect, distance to water, soils, and landforms) in order to predict where archaeological resources might be found (Kauhi 2013). It is not a substitute for conducting site-specific subsurface investigations. The King County Predictive Model is a model developed to generate estimates of archaeological sensitivity across the present-day landscape of King County that are derived from anthropological and archaeological theory rather than statistical analyses of extant archaeological data in Western Washington (Kopperl et al. 2016). It is similarly used as a tool for planning and risk analysis purposes. It is not a substitute for conducting site-specific subsurface investigations.

The King County Predictive Model identifies the Plan area as having a low sensitivity for AP 1; moderate sensitivity for AP 2; moderate to high sensitivity for AP 3; a moderate to high sensitivity for AP 4 and AP 5; and a moderate to high sensitivity for archaeological sites overall (Kopperl et al. 2016).

Broadly speaking, the Plan area is considered to be at high to very high risk for containing precontact-era archaeological resources (DAHP 2010; Kopperl et al. 2016; **Table 3.9-3**). Human modification of the landscape has greatly impacted the probability for the Plan area to contain intact sediments and, by extension, precontact-era archaeological resources. Disturbance episodes that have variably impacted the Plan area include the lowering of Lake Washington as a result of the 1916 Montlake Cut, agricultural development, domestic development, community, and transportation development.

TABLE 3.9-3
CULTURAL RESOURCES PROBABILITY ACROSS PLAN AREA

Service Area	King County Predictive Model (Kopperl et al. 2016)	Statewide Archaeological Predictive Model (DAHP 2010)	Cultural Resources Recommendation
Hunts Point & Yarrow Point	AP-1: Low; AP-2: Moderate; AP-3: Moderate; AP-4: High; AP-5: Moderate; Overall: High	Very High/High Risk	Cultural resources investigation advised.
Evergreen Point	AP-1: Low; AP-2: Moderate; AP-3: Moderate; AP-4: Moderate; AP-5: Moderate; Overall: Moderate	Very High/High Risk	Cultural resources investigation advised dependent upon proposed action.
Medina South	AP-1: Moderate; AP-2: Moderate; AP-3: High; AP-4: High; AP-5: Moderate; Overall: High	Very High/High Risk	Cultural resources investigation advised.
Meydenbauer Bay	AP-1: Low; AP-2: Moderate AP-3: High; AP-4: High AP-5: Moderate; Overall: Moderate	Very High Risk	Cultural resources investigation advised dependent upon proposed action.
Killarney	AP-1: Low; AP-2: Moderate AP-3: Moderate; AP-4: Moderate/Low; AP-5: Moderate; Overall: Moderate	Very High/High Risk	Cultural resources investigation advised dependent upon proposed action.
Newport South	AP-1: Low; AP-2: Moderate AP-3: Moderate; AP-4: Moderate/Low AP-5: Moderate; Overall: Moderate	Very High/High Risk	Cultural resources investigation advised dependent upon proposed action.

The Plan area is unique in that it primarily consists of a formerly inundated landform that was formed from glacial till and glacial outwash deposits. Some portions of the Plan area contain higher probability geologic landforms, such as younger alluvium where Meydenbauer Creek empties into Lake Washington (at the south end of the Meydenbauer Bay Service Area); and peat deposits where Mercer Slough empties into Lake Washington (at the south end of the Killarney Service Area); and younger alluvium where Coal Creek drains into Lake Washington (in the Newport South Service Area). Prior to the 1916 Montlake Cut, major drainages were utilized for canoe travel. These drainages and their confluences have the potential to retain evidence of canoe landings, temporary campsites, or resources gathering sites. It is generally less likely that intact precontact-era archaeological resources would be present across most of the Plan area; however, distinct locations are more likely retain a higher probability for encountering precontact-era archaeological resources.

It is more likely that historic-era archaeological resources would be encountered in the Plan area. Expected historic-era archaeological resources would likely be related to early- to late-19th century domestic and agricultural occupation and land use, as well as early- to mid-20th century community and transportation development. These may include structural foundations, abandoned infrastructure, privies, and dump sites.

Given the variability in land use history, geologic landforms, and the documented extent of prior ground disturbance as they relate to archaeological probability, it is advised that any area of

proposed ground disturbance be subject to review by an archaeologist to determine the likelihood for encountering and/or disturbing archaeological resources.

3.10 Public Utilities

This section describes the public utilities available to the Plan area and those that may be affected by the Plan.

3.10.1 Regulatory Setting

Numerous regulations apply to public utilities. The regulations most pertinent to the LWWLL Plan area are listed below (**Table 3.10-1**).

TABLE 3.10-1
REGULATIONS, STATUTES, AND GUIDELINES FOR PUBLIC UTILITIES APPLICABLE IN THE PLAN AREA

Regulations, Statute, Guideline	Description
Federal	
No applicable federal regulations related to public services and utilities.	
State	
Title 80 RCW: Public Utilities	Compilation of laws applicable to public utilities in Washington State.
Local	
Bellevue Comprehensive Plan 2015; Bellevue Municipal Code Title 24 Utilities Code	Provides information regarding future land uses and the policy framework for development related to public utilities
Beaux Arts Village Comprehensive Plan 2015; Beaux Arts Village Municipal Code Title 13 Public Utilities	
Hunts Point Comprehensive Plan 2015; Hunts Point Municipal Code Title 13 Public Utilities	
King County Comprehensive Plan 2020; King County Code Title 13 Water and Sewer Systems	
Medina Comprehensive Plan 2015; Medina Municipal Code Title 13 Public Services	
Yarrow Point Comprehensive Plan 2015; Yarrow Point Municipal Code Title 13 Public Services	

3.10.2 What public utilities are present in the Plan area?

Water, Sewer, and Solid Waste

Most of the drinking water supply for the Plan area, including Bellevue, Yarrow Point, Hunts Point, and Medina, is supplied through the Cascade Water Alliance (Cascade Water Alliance 2022). Cascade Water Alliance purchases this water from the City of Seattle before distributing it. The source of this water is the Cedar and South Fork Tolt rivers (City of Bellevue 2022). Beaux Arts Village has its own water department that draws water for the town from a deep artisan well located near the north end of the beach. The Beaux Arts system is gravity fed and moves on

demand (Beaux Art Village 2022). The southern portion of the Plan area in King County is provided water by the Coal Creek Utility District (City of Renton 2019).

Wastewater in the Plan area is collected in the LWWLL. As described in Chapter 1, *Introduction and Summary,* the management of the LWWLL is the basis of this Plan. The LWWLL is approximately 14 miles of sewer lines that are underwater in Lake Washington or on the land directly adjacent to the lake (**Figure 3.1-1**). All wastewater in the Plan area is wastewater directed to the LWWLL. No wastewater treatment plants are located within the Plan area, but the system includes 15 pump/lift stations and eight flush stations (see **Figure 3.10-1**).

The stormwater system in the Plan area is a combination of streams, lakes, wetlands, pipes, catch basins, and flood control sites that eventually drain into Lake Washington. In the Plan area, storm drains collect and discharge stormwater directly to surface waters, including Lake Washington. Stormwater discharge occurs in compliance with each jurisdiction's NPDES permit. The permits allow discharge into surface waters as long as the jurisdiction implements BMPs to protect receiving water quality.

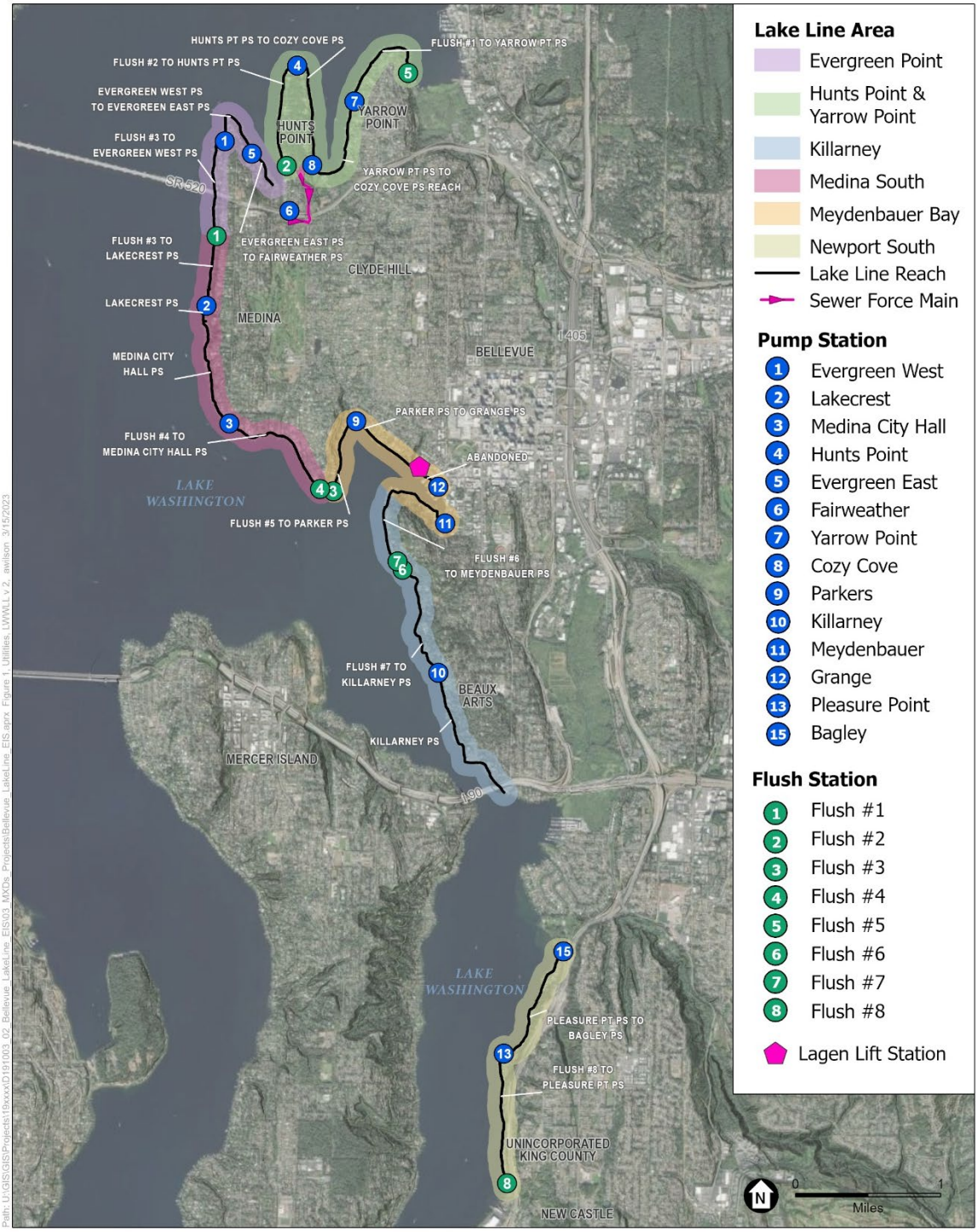
Solid waste services in the Plan area are currently provided by Republic Services, which offers garbage, recycling, and yard-waste collection services to its customers (Republic Services 2022).

Gas and Electric

Puget Sound Energy (PSE) provides electricity and natural gas to the municipalities located within the Plan area (PSE 2019). Overhead and underground transmission and distribution lines are located throughout the Plan area. No major gas lines are located within the study area (NPMS 2022).

Communications

The Plan area is located within an urban environment with adequate cellular reception. Internet, telecommunications, and cable TV providers throughout the Plan area include, but are not limited to, CenturyLink and Comcast.



SOURCE: Imagery: Maxar, 2021; Lift and Pump Stations: City of Bellevue, 2022; ESA, 2022

Bellevue Lake Line EIS

Figure 3.10-1
Existing Utility Lines

CHAPTER 4
Impacts

This chapter describes how construction and operation of the alternatives described in the Management Plan could potentially affect the environment in the Plan area. The alternatives are compared at a programmatic level to the extent that differences in their location, construction method, timing, and effects can be determined. The same elements of the environment described in Chapter 3 are addressed in this chapter, following the same general organization. The potential direct and indirect effects from both construction and operation are analyzed for the Plan alternatives and the No Action Alternative. Minimization and mitigation measures, including compliance with regulatory requirements, are described in Chapter 5, *Mitigation Measures*.

For the purposes of the impact analyses, the potential pipeline replacement technologies and rehabilitation approaches and construction methods (as summarized in Chapter 2, Section 2.6, and Appendix B) considered in the Management Plan were categorized as either open cut or trenchless construction methods to evaluate the potential impacts under each element of the environment. Potential construction impacts are temporary in nature and would primarily be addressed through compliance with municipal codes, BMPs, or other requirements. Temporary impacts inherent with construction (e.g., noise, traffic disruption, odors, or view blockage) would vary based on the site-specific improvements and would be analyzed during the completion of separate environmental reviews and development of detailed design for specific selected improvements. Because most of the facilities associated with the Plan would largely be underground, few operational impacts on the environment would result from Plan implementation; however, Plan implementation would result in a more reliable wastewater system.

The Plan's overall selection process for alternative and construction methods will consider and weigh the project benefits, impacts, additional evaluation factors, and location constraints to determine the best construction method strategies at any given location(s). More details on the evaluation factors, such as environmental, regulatory, social, technical, and cost, are included in Chapter 2, Section 2.8, *Implementation Approach and Timing*.

4.1 Land and Shoreline Use, Plans and Policies

This section describes the types of impacts that may occur to land and shoreline uses as well as visual quality impacts within the Plan area from implementation of the Plan alternatives. Land use refers to how humans use the land and how it is zoned (e.g., residential vs. public park space). Visual quality refers to the relationship of viewers and their environment. This includes visual and aesthetic resources such as parks, waterbodies, and other landscape features, as well as light

and glare. Visual quality is a way of describing the values of visual and aesthetic resources based on public, professional, and personal preferences. Expected impacts on land and shoreline are primarily affecting use and aesthetics of these areas, and are documented as either significant or less-than-significant. Significant adverse impacts refers to impacts that are potentially inconsistent with regulatory standards and/or permit requirements. Significant adverse impacts may require extensive mitigation measures or include situations that cannot be mitigated. For additional regulatory standards associated with land and shoreline use, as well as visual quality, refer to Chapter 3, Section 3.1.

The primary difference among the Plan alternatives is their physical location (in-water, on-shore, or upland). Overall, no changes in land use are expected that would be inconsistent with existing zoning and other regional plans. If replacement of an existing pump station were required in the same location, it would be consistent with existing zoning. If a new pump station is required in a residential area, it would likely be permitted through a conditional use process and be subject to the zoning and land use requirements in place at the time of permit application. **Table 4.1-1** provides an overview of expected impacts on land use and visual quality.

TABLE 4.1-1
OVERVIEW OF CONSTRUCTION AND OPERATIONAL IMPACTS ON LAND USE AND VISUAL QUALITY

Alternative	Impact	Significance Determination
Construction		
In-Water	Potential impacts on views from equipment. Access may be temporarily restricted to shoreline areas during in-water work at locations adjacent to Lake Washington that are zoned as public parks and spaces. Locations zoned as residential may experience temporarily restricted use of private access to shoreline during construction, including access to private docks. Appropriate control measures and construction requirements would be in place to minimize construction-related short-term increases in impacts on land use and views.	Less than significant
On-Shore	Potential to temporarily restrict public access to locations zoned as public parks and open spaces and may require easements to work on private property. May also result in changes to existing vegetative habitat, although any landscaping would be restored and changes in the land use designations are not expected. Appropriate control measures and construction requirements would be in place to minimize construction-related short-term increases in impacts on land use and views.	Less than significant
Upland	Similar to impacts described for the On-shore Alternative. Appropriate control measures and construction requirements would be in place to minimize construction-related short-term increases in impacts on land use and views. If property were acquired for new permanent above-ground facilities such as a pump station, there may be significant impacts on land use and visual quality.	Potentially significant

Alternative	Impact	Significance Determination
No Action	Potential for emergency construction if there is a system failure. Construction impacts would be similar to those described above. Easements would likely be needed and construction may interfere with access to properties and businesses.	Potentially significant
Operation		
Common to All Action Alternatives	Few to no impacts expected.	Less than significant
No Action	Few to no impacts expected.	Less than significant

4.1.1 What are the potential construction impacts associated with implementing the Plan?

Impacts Common to All Action Alternatives

Construction activities resulting from the Management Plan alternatives have the potential to cause short-term impacts on the use of land and shoreline resources and may have visual construction impacts from individual projects. Trenchless and open cut construction methods are possibilities for all Action Alternatives, and most of the facilities will be located underground. Exceptions result from new above-grade infrastructure, such as pump stations, maintenance access, or mechanical/electrical equipment. Existing uses and improvements that are removed to facilitate construction may also not be restored or replaced in their prior location. Specific plans for site access would be determined during project-level environmental review and include more detailed project design and construction specifications for each individual project. Many of the potential construction-related impacts on land use and visual aesthetics would be common to all the Action Alternatives and are described below. Following construction, most areas would be restored and returned to their pre-construction status.

Acquisition of Property and Easements

The repair, replacement, and maintenance of the aging pipes and pump stations may require acquisition of easements or private property for construction access, facilities, and staging areas. Construction will vary by alternative, but some activities will occur on private properties.

The availability of sites suitable for new pump stations and above-ground facilities is limited, as is the availability to provide additional maintenance hole or cleanout location access. This could result in the City needing to locate facilities in areas surrounded by residential or other types of land uses that could be affected during the construction period. To the extent possible, the City would avoid permanent private property acquisition and displacement of residents or businesses. Acquisition or permanent easements across private property are anticipated in some locations. If acquisition of private property or displacement of residents or businesses is necessary, the City would attempt to find willing property sellers, and would follow applicable federal, state, and local requirements for property acquisition, compensation, and relocation. If property were acquired for new permanent pump stations with above-ground facilities, there may be **significant impacts** on land use and visual quality.

Incompatibility with Surrounding Land Uses

Construction activities would be temporary and consistent with allowed land use codes. However, some construction activities, such as staging, may require temporary easements, or could limit access to portions of a project area or private property in the short term. These impacts would be noticeable throughout the construction period of an individual project. There is potential for construction of new infrastructure and facilities that could change views (for example, a new pump station); however, the impact would depend on what specific projects are implemented from the Plan. Overall, complete or total changes in views are not expected, and mitigation of visual impacts would be consistent with existing municipal code requirements from each jurisdiction. Land use designations would not be changed due to any of the Plan alternatives, and applicable permits would be obtained. If new permanent pump stations with above-ground facilities were constructed, they may potentially have a **significant impact** on land use and visual quality.

Construction could take place on private properties and may disrupt access to residences and businesses, potentially requiring detours around the construction sites. Construction may occur in the designated shoreline zone (within 200 feet of Lake Washington) and require compliance with the Shoreline Master Program in those areas. Views of Lake Washington could be temporarily obscured or disrupted by construction activities. Storage of pipe and other construction materials could occur in streets and could intermittently block or modify access to businesses and residences. These impacts would be temporary and would not permanently change surrounding land uses, so impacts on land use and visual quality would be **less than significant**.

Conflicts with Existing Plans and Policies

As described in Chapter 3, Section 3.1, each of the six jurisdictions has established land use plans and regulations that determine what types of utility facilities are permitted in each neighborhood. Section 3.1 describes the utility policies for each jurisdiction from the Shoreline Master Programs. Generally, these policies discourage new utility facilities within 200 feet of the shoreline; allow the replacement of existing utility facilities within 200 feet of the shoreline; allow for repair, maintenance, replacement, expansion, and upgrades to existing utilities; and require avoiding temporary and long-term adverse ecological impacts.

Generally, the Plan alternatives would not conflict with this policy guidance. The jurisdictions' land use regulations acknowledge that public facilities may need to be located in areas where the facility would not be compatible. When individual projects are carried forward under the Management Plan, Bellevue Utilities will apply for the required land use and construction permits required by each jurisdiction and will comply with the requirements of those permits. Each individual project would be required to comply with the Shoreline Master Program, environmentally critical areas ordinances, SEPA, and other land use and zoning regulations, and restore the area following construction. As a result, impacts would be **less than significant**.

Light and Glare

Construction timing would be consistent with that described in Section 3.7, *Noise,* and would generally occur from early morning to late evening, with light and glare impacts occurring

potentially in the morning or evening during the winter months. Expanded work hours may be requested, as allowed by each jurisdiction, for in-water work to complete work within regulated work windows required to avoid impacts on salmonids. This would introduce new sources of light and glare into the residential neighborhoods. In addition, safety lighting may be required at some construction sites during winter months. Nighttime construction is generally not expected; however, it may be needed for in-water work. More details about noise regulations, which include timing for construction, can be found in Section 3.7, *Noise*.

Light and glare from construction under each of the alternatives is expected to comply with each jurisdiction's municipal code; therefore, impacts would be **less than significant**.

In-Water Alternative

In addition to the impacts common to all Action Alternatives described above, construction of the In-Water Alternative may cause impacts on views from equipment such as a barge in front of docks and other equipment temporarily blocking views of Lake Washington. Access to shoreline areas may be temporarily restricted during in-water work at locations adjacent to Lake Washington that are zoned as public parks and open spaces. In addition, locations zoned as residential may experience temporarily restricted use of private access to shoreline during construction, including access to private docks.

Construction of the In-Water Alternative using trenchless methods would require access to the sections of the pipeline within Lake Washington by either using maintenance holes or excavating through the sediment to the pipe. Trenchless construction may also include installation of new pipelines, which requires access and disturbance to the lake bottom, outside of the current pipeline alignment. The operation of heavy machinery within Lake Washington would cause a temporary visual impact.

Construction of the In-Water Alternative using open cut methods would affect the areas where sections of the pipeline are accessed and would require excavation of more area compared to trenchless construction; impacts would be similar to trenchless methods but would be on a larger scale. Refer to Section 4.4, *Surface Water Resources*, for additional details about potential in-water impacts from construction. The installation and removal of in-water construction equipment would have a visual impact.

In-water work may occur adjacent to or near private home bulkheads or docks to access locations on the existing lake line. Impacts on these private facilities may occur, or may temporarily restrict residents' access to their private facilities. In-water work would comply with existing land use code and policies, and visual impacts would be temporary. As described in Chapter 5, disturbed areas would be restored to existing conditions following construction, therefore; land use and visual impacts are expected to be **less than significant**.

On-Shore Alternative

In addition to the impacts common to all Action Alternatives described above, construction of the On-Shore Alternative would likely have more activities and equipment near, on, or adjacent to private residences than the In-Water Alternative. Similar to the In-Water Alternative, these

activities may temporarily restrict public access to locations zoned as public parks and open spaces, and may require easements to work on public and private property. Work may occur adjacent to private residences, bulkheads, and docks. The On-Shore Alternative may also result in changes in existing vegetation, although any landscaping would be restored following construction. Changes in land use designations are not expected.

If using a trenchless construction method, the existing pipe would be accessed via a maintenance hole for trenchless rehabilitation or by excavating a launching/receiving pit. The size of the pit depends on the specific method of trenchless construction utilized. Since trenchless rehabilitation methods allow the underground structure to remain largely intact, and trenchless boring methods limit surface disturbance, trenchless construction is unlikely to have a major impact. Trenchless methods could also be used to construct a new pipeline along the shore, but would result in more impact due to the need for new access structures (maintenance holes).

Open cut methods would require excavation at locations where the existing pipeline is being replaced, and at new lateral side-sewer locations.

Construction staging, equipment placement, and sequencing would cause temporary impacts on land use and visual quality. As described in Chapter 5, disturbed areas would be restored to existing conditions following construction; therefore, land use and visual impacts are expected to be **less than significant**.

Upland Alternative

In addition to the impacts common to all Action Alternatives described above, construction impacts from the Upland Alternative would be similar to those described under the On-shore Alternative, including the potential for trenchless and open cut construction. However, there is no existing sewer system in upland areas, so construction would only include new infrastructure, and there would be no rehabilitation associated with this alternative. As described in Chapter 5, disturbed areas would be restored to existing conditions following construction; therefore, land use and visual impacts are expected to be **less than significant**.

Pump and Flush Station Improvements

Improvements to lift and pump stations could occur as part of the implementation of the alternatives. These improvements could range from replacing or upgrading individual components; significant upgrades (i.e., adding odor control; major repairs that do not require replacement of the structure itself); or complete replacement of the pump/flush station, including the structure. The impacts on land use and visual resources during construction would vary depending on the type of improvements. **Table 4.1-2** describes the potential impacts on land use and visual resources for each improvement option.

TABLE 4.1-2
IMPACTS ON LAND USE AND VISUAL RESOURCES FROM CONSTRUCTION IMPROVEMENTS AT PUMP AND FLUSH STATIONS

Improvement Options	Potential Impacts	Significance Determination
1) Replacing or upgrading individual pump station mechanical and electrical components	Few to no impacts apart from potential visual and access impacts from excavation equipment needed to access individual components. Duration could range from 1 week to 1 month.	Less than significant
2) Significant upgrades, excluding structure replacement	Minor to moderate excavation would be required depending on the type of updates selected; site availability would be determined during the design process, in addition to site constraints. Improvements could require strategic management of excavated materials for 4 to 6 months.	Less than significant
3) Replacement of the pump/flush station, including the structure	Moderate excavation would be required to accommodate the new structure, with potential for increase disturbances from construction activities, equipment, and staging. Improvements could either occur on the existing parcel, depending on site availability, or a new location may be necessary requiring staging area management for greater than 6 months. A new location could have more of an impact than a replacement at an existing location. Some residents may feel this impact is significant.	Potentially significant

No Action Alternative

Under the No Action Alternative, the City would continue with existing operational and maintenance strategies to maintain the service life and limit degradation of the existing wastewater lake line infrastructure in place. The actions identified in the Management Plan would not be fully implemented in a holistic manner. Actions could include review of operations procedures, cleaning and inspection, access improvements (maintenance hole, cleanout installation), data collection, and emergency repairs. Emergency actions under the No Action Alternative would be difficult based on the limited time and ability to plan appropriately and implement avoidance and minimization. Emergency actions would likely be conducted quickly in response to a problem or failure in the system, and would not likely have the opportunity to fully plan for the repair and minimize disruptions to the surrounding area. Property acquisitions would not likely be required for these activities because work would occur at existing pipeline, pump, lift, and flush locations; however, easements could be needed. Construction activities may interfere with access to properties or businesses. Therefore, impacts are expected to be **potentially significant**.

4.1.2 What are the potential operational impacts on Land Use?

Common to All Alternatives

Generally, none of the projects proposed for any of the alternatives would cause land use or visual impacts during operation because there would be no change in land use conditions, including for replacing existing infrastructure. Visual impacts from construction staging, equipment, and activities would be temporary and would be restored following construction. If a new pump station or other above-ground infrastructure were built where it did not exist before, it

would likely go through a conditional use process and could have **potentially significant** impacts on land use or visual impacts.

Overall, the operational impacts on land use and visual quality from the In-Water, On-Shore, and Upland Alternatives would be minor. With the implementation of site-appropriate design, potential adverse impacts would be avoided and minimized.

Pump and Flush Stations

Once constructed, new above-grade facilities such as a new pump station may potentially impact land use or visual resources in the Plan area. Depending on location, land use and visual quality impacts are expected to be **potentially significant**.

No Action Alternative

Under the No Action Alternative, the existing land use policies and visual quality in the Plan area would essentially remain unchanged. Projects completed as part of the ongoing operational strategies and piecemeal repair and replacement may temporarily restrict access to public parks, open spaces, and the shoreline. Land use and visual quality impacts associated with the No Action Alternative are expected to be **less than significant**

4.2 Earth Resources

This section describes the types of impacts that could occur to the geological setting and soils within the Plan area during implementation of Management Plan alternatives. Impacts on earth resources are documented as either significant or less-than-significant; significant adverse impacts are those that are potentially inconsistent with regulatory standards and/or permit requirements that may require extensive mitigation measures or situations that could not be mitigated. For example, development within geologic hazard areas and critical area buffers is subject to required performance standards and restrictions during design and construction, and if standards could not be met, significant impacts could occur. For additional regulatory standards associated with earth resources, refer to Chapter 3, Section 3.2. **Table 4.2-1** provides an overview of anticipated impacts on earth resources.

TABLE 4.2-1
OVERVIEW OF CONSTRUCTION AND OPERATIONAL IMPACTS ON EARTH RESOURCES

Alternative	Impact	Significance Determination
Construction		
In-Water	• Excavation would impact the geologic setting and soils at access locations. • Potential for pollutants to enter the surrounding earth and soils and risk of potential environmental contamination to the lake. • Construction would be temporary and appropriate control measures, design specifications and engineering standards would be met to minimize impacts.	Less than significant

Alternative	Impact	Significance Determination
On-Shore	• Excavation impacts on the geologic setting and soils at access locations on shore. • There is potential for pollutants such as diesel, gasoline, oil, grease, and hydraulic fluid to be released. • Construction and excavation at project sites would expose bare soils, making the sites more susceptible to erosion during rain events. • Exposed soils could impact surrounding water quality, contaminate adjacent soils, and create dusty conditions. • Construction would be temporary and appropriate control measures, design specifications, and engineering standards would be met to minimize impacts.	Less than significant
Upland	Similar to impacts described for the On-Shore Alternative. • Impacts from excavation would impact the geologic setting where new infrastructure is placed upland. • Excavation impacts on the geologic setting and soils on-shore. • Construction would be temporary and appropriate control measures, design specifications, and engineering standards would be met to minimize impacts.	Less than significant
No Action	• Individual actions would have a limited footprint and are unlikely to result in substantial erosion or dewatering. • Potential for greater construction impacts than those listed above due to inability to plan for typical control measures if emergency repairs are required.	Less than significant
Operation		
Common to All Action Alternatives	Once constructed, no impacts are expected. No soils would be exposed following construction and site restoration. Impacts would be limited to geologic hazards that already exist.	Less than significant
No Action	The existing earth and groundwater environment in the Plan area would essentially remain unchanged. Risk of system failure and substantial contamination possible.	Less than significant Potentially significant if a system failure occurred

4.2.1 What are the potential earth-related construction impacts?

The primary difference among the alternatives is their location (in-water, on-shore, or upland). Many of the potential construction-related impacts on the geological setting and soils would be common to all the Action Alternative construction methods.

Impacts Common to All Action Alternatives

Construction activities under the Management Plan Alternatives have the potential to cause short-term impacts on earth and soils. Short-term impacts from construction methods under each

alternative range from those that would cause minimal displacement of soil, to methods that would involve substantial excavation, trenching, or tunneling and removal of large soil quantities. Construction using trenchless or open cut construction methods will require staging areas, where there is the highest probability of spills. The open cut methods would have similar risks of spills and leaks as under trenchless methods. However, since the open cut method would require more equipment and could include ground-disturbing activities, the risk for loosening soils and inadvertent leaks and spills would be slightly higher.

All construction would occur under appropriate control measures, must meet wastewater engineering standards, and would be in accordance with required design specifications. Considering the required standards and measures for construction and the evaluation of geologic risks prior to construction, construction-related short-term increases in soil and earth disturbance and pollutant discharges from construction activities utilizing open cut or trenchless construction methods would represent **less-than-significant** impacts on the geologic setting and soils.

Erosion

Erosion by rain, runoff, or wind may occur from clearing vegetation, placing fill, and removing, grading, or stockpiling uncovered spoils during construction. The potential for erosion depends on the area, slope, and characteristics of exposed soils; the volume and configuration of spoils piles; and the intensity and duration of rain, runoff, or wind.

Slope Failure

Depending on the selected construction method and project design and location, construction has the potential to cause hillside slumping or sliding due to changes in grade, removal of vegetation, and introduction of new loads to the hillside. Construction on steep slopes or areas with inappropriate geological conditions would be especially susceptible to slope instability. Excavations and trenching for structure foundations and pipe installation in any location, if not shored correctly, could fail and damage adjacent utilities, roadways, and structures and represent **potentially significant** impacts.

Unsuitable or Excess Soils

Existing soils that cannot be reused as structural fill or landscape material would require removal and disposal. Liquefiable soils, particularly peat and other organic-rich soils, may be especially unsuitable for use as structural fill. Off-site disposal would generate temporary truck traffic, dust, road runoff, temporary diesel emissions from a tugboat pulling a barge or a self-propelled barge, and other construction-related impacts.

Dewatering

Dewatering of excavations below the groundwater table could result in settlement of nearby structures, roadways, and utilities. The potential for impact is low if proper measures to minimize and avoid dewatering are used. Dewatering also has the potential to encounter contaminated groundwater requiring special disposal. Refer to Section 4.4, *Surface Water,* for additional discussion on dewatering.

Spoils Disposal

Spoils that are unsuitable for project reuse would require disposal at an appropriate facility. Fill material with appropriate engineering properties may be required for most projects and would need to be imported from off-site sources.

In-Water Alternative

In addition to the impacts common to all Action Alternatives described above, construction of the In-Water Alternative using trenchless and open cut methods would affect earth and soils at the site-specific areas where sections of the pipeline are accessed when trenchless methods are used. Access to the pipeline within Lake Washington would be reached through the sediment to the pipe or utilizing maintenance holes. Trenchless construction may also include installation of new pipelines, which requires access and disturbance to the lake bottom outside of the current pipeline alignment. If the pipelines are accessed via maintenance holes, there is not likely to be any surface disturbance or excavation required and if required, excavation would be minimal. Trenchless access to the pipeline through the sediment in the water for existing pipeline rehabilitation could result in additional surface disturbance and increase the risk of turbidity and releasing potentially contaminated sediment into Lake Washington.

Construction impacts for open cut would be similar to those discussed above for the trenchless methods but would be at a larger scale, impacting more sediment within the lake. Open cut methods would require excavation of substantially more material as compared to trenchless methods and would require dedicated material handling if working in the lake. Disturbance of sediment related to construction would likely increase turbidity and would have the risk of releasing sediment and potentially contaminated soils into Lake Washington. The wet and silty conditions created at excavation locations in the lake may lead to settling of materials in other locations and require the need to export and replace excavation earth with imported materials. However, the removal of material with open cut methods would result in easier removal of any potential obstructions encountered as compared to trenchless methods.

Open cut methods within the lake could require substantial dewatering efforts, sediment control strategies, and work from a barge. Dewatering may be required to remove water that seeps into the work area during construction. Cofferdams may be used to remove the water in the access areas. The amount of dewatering would vary depending on the excavation duration, area, and quantity, as well as the groundwater elevation and amount of rainfall. Water from dewatering would be either discharged to adjacent surface waters or the sewer system, depending on the water quality and quantity and site constraints. Potential for impact on the geological setting is low if proper measures to minimize and avoid dewatering are used.

The operation of heavy machinery within Lake Washington has the potential for pollutants such as diesel, gasoline, oil, grease, and hydraulic fluid to enter the surrounding earth and soils and risk of potential environmental contamination associated with in-water work. Additionally, potential soil contamination could be associated with the removal and/or demolition of existing asbestos cement (AC) pipes, and special construction methods would be required to handle, remove, and dispose of asbestos materials.

Considering the required standards and measures for construction and the evaluation of geologic risks prior to construction, construction-related short-term increases in soil and earth disturbance and pollutant discharges from in-water alternative activities utilizing open cut or trenchless construction methods would represent **less-than-significant** impacts on the geologic setting and soils.

On-Shore Alternative

In addition to the impacts common to all Action Alternatives described above, construction of the On-Shore Alternative using pipeline rehabilitation or trenchless and open cut methods of new pipe construction would affect earth and soils. For trenchless rehabilitation, the existing pipe would be accessed via a maintenance hole or by excavating a launching/receiving pit. The size of the pit depends on the specific method of trenchless construction utilized. Since trenchless rehabilitation methods result in limited disturbance of surface soils and most of the underground structure would remain intact, this construction is unlikely to have a significant impact on the geological setting or soils. For trenchless construction, a new pipeline along the shore would likely be constructed using an auger bore or horizontal directional drill, depending on site constraints. Locations where soil may be impacted include areas where soil is moved to construct launching/receiving pits, for access to staging areas, and the displacement of soil during bored installations. Excavation would also be required at all side-sewer connections. Dewatering may be necessary where boring and excavation occurs. Dewatering methods are described in detail in Section 4.4, *Surface Water.*

Open cut methods would require excavation at locations where the existing pipeline is replaced, and at new lateral side-sewer locations. Open cut methods would require excavation of more material as compared to trenchless methods. Construction and excavation at project sites would expose bare soils, making the sites more susceptible to erosion during rain events. In general, larger sites have more potential for releases of turbid site runoff due to the larger area of exposed soils. Exposed soils could impact surrounding water quality, contaminate adjacent soils, and create dusty conditions. Soils may be contaminated by fuels, oil, metals, and organic compounds from construction operations. Loosened soils could increase the likelihood for settling or shifting over time and erosion. Construction on steep terrain in on-shore areas could destabilize the shoreline. Any areas disturbed during construction would be subject to increased erosion, and control measures would be required.

Depending on the soils excavated and the ability of reuse for fill or landscaping materials, removal and disposal (potentially at special disposal facilities) of large quantities of soil may be required, particularly for the open cut construction method. Existing soils that cannot be reused as structural fill or landscape material would require removal and disposal, and additional soils may need to be imported.

Dewatering would likely be needed for excavation for open cut construction methods, depending on the depth of the infrastructure and the relationship to the groundwater table. Dewatering would be needed at a larger scale for open cut as compared to the trenchless methods as more area would be excavated. Dewatering is described in detail in Section 4.4, *Surface Water*. For the geological setting, dewatering could cause ground settlement of nearby structures, roadways, and

utilities, as well as potential infiltration from areas adjacent to the excavation. Potential for impacts on the geological setting is low if proper measures to minimize and avoid dewatering are used. In areas with geologic hazards (such as steep slopes and areas with loose, saturated soils prone to liquefaction, artificial fill or lands with unpredictable soil characteristics, and/or impermeable soils or extensive impervious paved surfaces), **potentially significant** impacts are possible from settling or shifting over time, erosion, and accumulation of water on impervious surfaces.

Oils, fuels, solvents, or other construction-related chemicals could leak or spill from equipment during construction, contaminating adjacent soil under both the trenchless and open cut construction methods resulting in **potentially significant** impacts if BMPs are not implemented.

Upland Alternative

Construction impacts from Upland Alternative would be similar to those described for impacts common to All Alternatives and the On-Shore Alternative, including the potential for trenchless and open cut construction. However, there is no existing sewer system in the upland area, so there would be no rehabilitation associated with this alternative. The Upland Alternative would result in the most amount of impacts on the geologic setting and soils since it would require more excavation for new infrastructure at all locations as compared to the other Action Alternatives. Construction-related short-term increases in soil and earth disturbance from the Upland Alternative utilizing open cut or trenchless construction methods would represent **less-than-significant** impacts on the geologic setting and soils.

Pump and Flush Station Improvements

Improvements to pump stations could range from replacing or upgrading individual components, significant upgrades (i.e., adding odor control, major repairs that do not require replacement of the structure itself), or complete replacement of the pump/flush station, including the structure. The impacts on the geological setting and soils during construction would vary depending on the type of improvements at each pump station, generally varying by the amount of excavation required. **Table 4.2-2** describes the potential impacts on earth and soils for each improvement option.

No Action Alternative

Under the No Action Alternative, the City would continue with existing operational and maintenance strategies to maintain the service life and limit degradation of the existing wastewater lake line infrastructure. Methods could include review of operations procedures, cleaning and inspection, access improvements (maintenance hole, cleanout installation), data collection, and emergency repairs. Emergency actions under the No Action Alternative would be difficult based on the limited time and ability to plan appropriately and implement avoidance and minimization and may cause temporary impacts on soils and the geologic setting. Individual actions constructed under these strategies generally have a limited footprint and depth and are unlikely to result in substantial erosion or dewatering, and would occur on an as-needed basis. As such, impacts are considered **less than significant** on earth resources under the No Action Alternative.

TABLE 4.2-2
IMPACTS ON EARTH RESOURCES FROM CONSTRUCTION IMPROVEMENTS AT PUMP AND FLUSH STATIONS

Improvement Options	Potential Impacts	Significance Determination
1) Replacing or upgrading individual components	Few to no impacts on earth or soils; minor excavation may be necessary to access individual components; duration could range from 1 week to 1 month.	Less than significant
2) Significant upgrades, excluding structure replacement	Minor to moderate excavation would be required, depending on the type of updates selected; site availability would be determined during the design process, in addition to site constraints. Improvements could require strategic management of excavated materials for 4 to 6 months.	Less than significant
3) Replacement of the pump/flush station, including the structure	Moderate excavation would be required to accommodate the new structure, with potential for erosion, contamination, slope failure, and dewatering impacts. Improvements may either occur on the existing parcel, depending on site availability, or a new location may be necessary requiring movement and strategic management of materials for greater than 6 months, in addition to staging area management.	Less than significant

4.2.2 What are the potential earth-related operational impacts?

Common to All Action Alternatives

Once constructed, none of the improvements would impact any soils or geological characteristics of the Plan area. Generally, operation of the projects under any of the alternatives would not cause erosion impacts because no soils would be exposed following construction and site restoration. Operational impacts would generally be limited to geologic hazards that already exist. For example, based on the geological setting of the Plan area, the risk of seismic events is a factor to consider during system operation. If an uncontrollable seismic event were to occur, the event could result in other related geologic hazards, such as liquefaction and seismic-induced slope failures, which could impact the lake line system. The risk of seismic events affecting the lake line system in the Plan area would be present regardless of the improvements since most of the waterfront portion of the Plan area is prone to liquefaction (see Section 3.2.3).

Overall, the operational effects from the In-Water, On-Shore, and Upland Alternatives would be minor. With the implementation of site-appropriate design, potential adverse impacts would be avoided and minimized. Therefore, operational impacts would be considered **less than significant** on soils or geological characteristics.

Pump and Flush Stations

Once constructed, maintenance and operation of the pump stations would not have operational impacts on soils or geological characteristics of the Plan area. The improvements to the pump stations would be designed to minimize impacts on the lake line system from the existing known seismic hazards. The operation of the pump stations would not affect the earth setting, and all facilities would meet seismic design standards, which are intended to minimize the long-term risks to the system.

No Action Alternative

Under the No Action Alternative, the existing earth and groundwater environment in the Plan area would essentially remain unchanged. Projects completed as part of the ongoing operational strategies and piecemeal repair and replacement could cause erosion if they are not properly maintained. Actions included as part of operational strategies would meet seismic design standards.

Under the No Action Alternative, the current sewer line would be left in its current condition and be vulnerable to future failures. Some sections of the Lake Washington sewer line have less than one-third of their remaining useful life left and will require replacement within the next decade, while other sections may not need replacement until the mid-2050s. However, as the infrastructure continues to age, the likelihood of failure increases, which could range from small leaks to system failure. The frequency, likelihood, and potential impact of failure of the system as it ages would also increase. Undetected leaks over an extended period could contaminate adjacent soils and increase the potential for erosion. A large disruptive event to the system, such as a break in the system, could cause substantial contamination to earth resources and extensive water release, which could move soils in geologically hazardous areas, affecting the surrounding structures, and increasing existing risks in geologic hazardous areas. A lake line system failure could also increase the need for environmental mitigation due the local environment that was impacted (e.g., lake, wetland, stream, or riparian area). In addition, a lake line system failure could increase the emergency response requirements for repair construction, clean up, and operations and lead to more complex upgrades to a failing system, in potentially contaminated areas, with increased geologic risk, such as erosion or sliding from moved and/or unsettled soils. Therefore, the No Action Alternative could result in potentially **significant impacts** on the geologic setting in the future as the system continues to age should a system failure occur.

4.3 Air Quality and Odor

This section describes the types of impacts that could occur to air quality within the Plan area during implementation of Management Plan alternatives. Impacts on air quality are documented as either significant or less-than-significant; significant adverse impacts are those that are potentially inconsistent with regulatory standards and/or permit requirements that may require extensive mitigation measures or situations that could not be mitigated. For example, federal and state standards require specific air quality standards to be met, and if standards could not be met, significant impacts could occur. For additional regulatory standards associated with air quality, refer to Section 3.3, *Air Quality and Odor.* **Table 4.3-1** provides an overview of expected impacts on air quality and odor.

TABLE 4.3-1
OVERVIEW OF CONSTRUCTION AND OPERATIONAL IMPACTS ON AIR QUALITY AND ODOR

Alternative	Impact	Significance Determination
Construction		
In-Water	• Potential dust and emissions from material excavation and dewatering efforts and construction equipment at staging areas could affect localized air quality. • Potential for temporary odors around the construction areas through disturbance of detritus in the water or along the shoreline. • Appropriate control measures and construction requirements would be in place to minimize construction-related short-term increases in dust and emissions.	Less than significant
On-Shore	• Potential dust and emissions from material excavation and exposing bare soils, during construction trips, and at staging areas could affect localized air quality. • Potential for pollutants release and risk of potential environmental contamination. • Appropriate control measures and construction requirements would be in place to minimize construction-related short-term increases in dust and emissions.	Less than significant
Upland	Similar to impacts described for the On-Shore Alternative. Appropriate control measures and construction requirements would be in place to minimize construction-related short-term increases in dust and emissions.	Less than significant
No Action	Potential for emergency construction if there is a system failure causing odors and short-term air quality impacts.	Less than significant
Operation		
Common to All Action Alternatives	Few to no impacts expected.	Less than significant
No Action	Few to no impacts expected.	Less than significant

4.3.1 What are the potential air quality and odor construction impacts?

Many of the potential air quality and odor construction-related impacts would be common to all the Action Alternatives and construction methods.

Impacts Common to All Action Alternatives

Air emissions during construction are influenced by construction techniques, types of equipment used, self-propelled barge or tugboat trips, truck trips, worker commute trips, and construction duration. Reduced air quality from construction emissions has a greater impact in residential areas than in commercial and industrial areas. In addition, there are some sensitive receptors – those structures and uses that are most sensitive to reduced air quality, such as nursing homes, daycare centers, and schools – located within the jurisdictions of the Plan area (see Figure 3.3-1 in Section 3.3). Many of the potential construction-related air quality impacts would be common to all of the Action Alternative construction methods.

Dust

Air quality impacts from construction-related dust would vary during the stage of construction. Impacts would likely be greatest at the beginning of a project as a result of earth moving, land clearing, and excavation. Sources of construction-related dust include disturbed soils at the construction sites and trucks or barges carrying loads of soils. If not properly controlled, vehicles leaving construction sites could deposit mud on local streets, which could be an additional source of airborne dust after it dries. Similarly, barge transport of excavated material could result in additional sources of airborne dust if not properly controlled during transport.

Odors and Emissions

Some projects would require a substantial amount of construction equipment operation and truck or barge trips, which would increase emissions. Emissions from gasoline and diesel-powered construction equipment and trucks include carbon monoxide, particulate matter, sulfur dioxide, nitrogen oxides, and volatile organic compounds. Sulfur dioxide is an odorous compound generated during combustion of diesel fuel. An additional source of odor, detritus (dead particulate organic material, typically located near water and along shorelines) could be disturbed by barge construction access, docking of the barge, or shoreline vehicular construction access.

Particularly in low-traffic residential areas, increases in truck trips would substantially increase short-term odors and emissions over background conditions. If construction traffic reduces the speed of hauling trucks and other vehicles in the area, carbon monoxide emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be limited to peak construction periods and to the immediate area surrounding the construction site. In general, emissions would vary depending on the project and construction phase. The longer project construction lasts, the longer nearby air quality would be affected by construction emissions. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of paving sites. Such odors would be quickly dispersed below detectable thresholds as distance from the site increases. Sewer odors may also be present during improvements as a result of required sewer bypass pumping necessary during construction.

In-Water Alternative

Construction of the In-Water Alternative using trenchless or open cut methods could affect the air quality in site-specific areas where the pipeline is accessed. For trenchless construction, installation of the pipeline within Lake Washington would be by boring through the soil. Select trenchless methods may be able to utilize maintenance holes where excavation would be minimal. In this case, odors from the pipeline system would also be minimal during construction. Impacts on air quality and odor would be concentrated at access sites instead of spread across a distance, as in open cut methods.

Boring through the soil in the water may disturb detritus in the water or along the shoreline, creating temporary odors around the construction areas. Emissions from construction equipment could affect the air quality around the staging areas, which could either be on-shore or on a boat. The operation of heavy machinery within Lake Washington has the potential for pollutants such as diesel, gasoline, oil, grease, and hydraulic fluid to affect the surrounding air quality and risk of

potential environmental contamination associated with in-water work. Short-term localized impacts on air quality would be expected from construction activities under open cut methods for the In-Water Alternative. The use of heavy equipment and trucks would end once construction is completed and would not be concentrated in any one area over the duration of construction. However, construction would be dispersed over many years in many locations, and only temporarily affect residential and commercial properties for a short time in any given location.

Construction of the In-Water Alternative using open cut methods would affect the air quality through dust and emissions from construction equipment and from the excavation of material, and would require dedicated material handling when working in the lake. The potential for settling of materials in other locations could require the need to export and replace the excavation materials with imported materials, adding to the number of barge or vehicular trips and emissions and potential for dust. Dust could be released from the excess soils during movement to staging areas, either by barge or truck trips. Disturbance of sediment related to construction would likely result in increases in turbidity and could affect surrounding detritus and add to associated organic material odors and temporary odors around the construction areas. Given the control measures implemented during construction, odors from the pipeline system would be minimal.

Construction with trenchless methods would be more localized to access areas and have fewer air quality impacts. Trenchless methods would typically involve a smaller construction footprint, which would result in short-term, localized emissions. Construction impacts with open cut methods would be similar to those for trenchless methods but would be at a larger scale with a larger footprint, require more excavation, and have more construction air quality impacts. With appropriate control measures and with construction requirements in place, construction-related short-term increases in dust and emissions associated with trenchless or open cut construction methods with the In-Water Alternative would represent **less-than-significant** impacts on the surrounding air quality and odors.

On-Shore Alternative

Construction of the On-Shore Alternative using pipeline rehabilitation or trenchless and open cut methods of new pipe construction would affect the air quality through dust and emissions in the areas of construction. Since trenchless rehabilitation methods and trenchless new pipeline methods result in limited disturbance of surface soils, this construction would unlikely have a significant impact on air quality. Impacts on air quality and odor would be concentrated at trenching portal sites instead of spread across a distance, as in open cut methods. Excavation at side-sewer connections and potential trenches may be necessary to access side-sewers; airborne dust could affect air quality in these locations.

Construction using trenchless methods would cause the least amount of disturbance to surface soil and associated dust. During construction, oils, fuels, solvents, or other construction-related chemicals could leak or spill from equipment, affecting surrounding air quality. Air quality may be impacted where soil is moved for access to staging areas and by the number of construction vehicular trips. Emissions would occur at these working spaces and staging areas, where the probability of spills is highest. Emissions, dust, and odors would occur during the transport of

material or equipment between the workspaces. Impacts would be concentrated at fewer locations under the trenchless construction methods.

Construction impacts with open cut methods would be similar to those described above for trenchless methods but would be at a larger scale and require more excavation and have more risk of impacting air quality. Construction of the On-Shore Alternative using open cut methods could affect air quality through additional trips needed to perform work in multiple linear areas. Construction and excavation at project sites would expose bare soils through potential removal of asphalt and concrete, making the sites more likely to affect local air quality. Vegetation removal could also expose additional soils. In general, larger sites have a greater potential for releases of dust and odors due to the larger area of exposed soils and additional construction trips. Construction operations and trips would cause construction equipment and truck emissions and temporarily degrade air quality. The operation of heavy machinery in on-shore areas has the potential for pollutants such as diesel, gasoline, oil, grease, and hydraulic fluid to affect the surrounding air quality and risk of potential environmental contamination. Dewatering would be needed at a larger scale for open cut construction methods due to infiltration, where additional pumping equipment would be needed and could increase the dust and emissions. Imported materials may be needed and would add to the number of barge or vehicular trips and emissions and potential for dust and odors. Barge trips may be used for the On-Shore Alternative construction methods if access from land is limited.

The open cut construction methods would not have a significant impact on the regional air quality but may result in minor localized impacts during the construction periods, largely related to vehicle emissions and dust. Short-term localized impacts on air quality would be expected from construction activities under any of the Action Alternatives. The use of heavy equipment and trucks would end once construction is completed and would not be concentrated in any one area over the duration of construction. However, construction would occur over many years in many locations and only temporarily affect residential and commercial properties at any given location.

In summary, construction with trenchless methods would be of short duration, localized to access areas, and would have minimal air quality impacts. Trenchless methods would involve a smaller construction footprint, which would result in short-term, localized emissions. Using open cut methods would require the excavation of sections of pipeline for replacement and result in a longer duration of construction-related air quality and emissions impacts. Both construction methods would incorporate measures to reduce or control dust and emissions, especially to minimize impacts on neighboring properties. With appropriate control measures and with construction requirements in place, construction-related short-term increases in dust and emissions associated with open cut or trenchless construction methods with the On-Shore Alternative would represent **less-than-significant** impacts on the surrounding air quality and odor.

Upland Alternative

Construction impacts from the Upland Alternative would be similar to those described for the On-Shore Alternative, including the potential for trenchless and open cut construction. However, there is no existing sewer system and there would be no rehabilitation associated with this alternative. The Upland Alternative open cut construction method would result in the most

amount of air quality impacts due to the increased excavation and truck trips required for the new infrastructure; trenchless methods would require new pipeline installation and cause temporary air quality impacts in construction areas. In combination with the measures indicated for the On-Shore Alternative, construction-related short-term increases in air quality impacts from the Upland Alternative utilizing open cut or trenchless construction methods would represent **less-than-significant** impacts.

Pump and Flush Station Improvements

The impacts on air quality and odor during construction of pump station improvements would vary depending on the type of improvement and the duration of construction; in general, more construction trips would create more localized emissions. **Table 4.3-2** describes the potential impacts on air quality and odor for each improvement option.

TABLE 4.3-2
IMPACTS ON AIR QUALITY AND ODOR FROM CONSTRUCTION IMPROVEMENTS AT PUMP AND FLUSH STATIONS

Improvement Options	Potential Impacts	Significance Determination
1) Replacing or upgrading individual components	Few to no impacts on air quality; minor emissions from transport of materials and minor odors during component upgrade for a duration ranging from 1 week to 1 month.	Less than significant
2) Significant upgrades, excluding structure replacement	Potential for dust and emissions from material and equipment transport and minor odors during upgrades. Improvements could require strategic management of dust from excavation materials and emissions for 4 to 6 months. Bypass pumping around the pump station may be necessary during construction and could cause temporary sewer odors.	Less than significant
3) Replacement of the pump/flush station, including the structure	Moderate amount of construction trips to replace structure at the stations; emissions and dust would likely affect air quality surrounding the selected site. Improvements could occur either on the existing parcel, depending on site availability, or a new location may be necessary requiring movement and strategic management of materials for greater than 6 months, in addition to staging area management of dust from excavated materials. Bypass pumping around the pump station may be necessary during construction and could cause temporary sewer odors.	Less than significant

No Action Alternative

Under the No Action Alternative, the City would continue with existing operational and maintenance strategies to maintain the service life and limit degradation of the existing wastewater lake line infrastructure. Methods could include review of operations procedures, cleaning and inspection, access improvements (maintenance hole, cleanout installation), data collection, and emergency repairs. Individual actions constructed under these strategies generally have a limited footprint and depth and would unlikely result in substantial impacts on air quality. The potential for odors from sewer spills and necessary emergency bypass pumping / piping would increase with the No Action Alternative when compared to the Action Alternatives due to

the emergency nature of the repairs and the limited time to properly handle odors on-site. The associated odor impacts would be temporary in nature and not result in substantial odor impacts.

Ongoing system improvement projects have minimal air quality impacts because they are small and located within public rights-of-way or private property that is typically already developed or landscaped. Emissions during construction would include dust from grading, sod-cutting, and rototilling activities, as well as exhaust from vehicles and construction equipment. These emissions are minimal, localized, and temporary; as such, the No Action Alternative would have **less-than-significant** impacts on air quality and odors.

4.3.2 What are the potential operational impacts on air quality and odor?

Common to All Action Alternatives

Once constructed, none of the improvements would impact air quality in the Plan area. The lake line system components (lake lines, pump stations, lateral side-sewers, gravity mains) would be designed to control odor emissions and airborne pollutants. When constructed, most of the infrastructure would be located underground and would not affect surrounding air quality. The net operational impacts of the Action Alternatives on air quality and odors would be **less than significant** in the Plan area.

Pump and Flush Stations

Once constructed, maintenance and operation of the pump stations would not have operational impacts on air quality of the Plan area. Improvements to the pump stations would be designed to include measures to control odor emissions and airborne pollutants, such as a ventilation system to filter the air, as appropriate. Station improvements would be designed to minimize odors. The potential for odors would depend on the wastewater characteristics (dissolved sulfide, dissolved oxygen, pH, temperature, etc.), wastewater hydraulics, and facility operation (cleaning, etc.). Odors would not likely be noticeable outside of the pump or flush stations under normal operating conditions.

Emissions from maintenance vehicles would not exceed the levels or number of trips outside normal system maintenance. Operational emissions would be limited to vehicle and equipment emissions associated with periodic maintenance activities and infrequent use of emergency generators. All emergency generators would be required to incorporate Best Available Control Technology (BACT) to minimize pollutant emissions. Since the generators would operate only during power outages and testing, emissions would be infrequent and of short duration. These emissions would be minimal and would not produce localized air quality impacts. Overall, the effects of odors and emissions from the operation of the pump stations would represent **less-than-significant** impacts on air quality and odor.

No Action Alternative

Under the No Action Alternative, the existing air quality in the Plan area would essentially remain unchanged. No air quality impacts or increased odors are expected from the ongoing

maintenance and operational strategies used to extend the service life and limit degradation of the existing wastewater lake line infrastructure. Projects completed as part of the ongoing operational strategies and piecemeal repair and replacement could increase localized odors if they are not properly maintained. Actions included as part of operational strategies would meet air quality standards and minimize odors. As such, operational impacts of the No Action Alternative are expected to be **less than significant** on air quality and odors.

4.4 Surface Water Resources

This section describes types of impacts that could occur to surface water resources within the Plan area during implementation of the Plan alternatives. Impacts on surface water resources are categorized as either significant or less-than-significant; significant adverse impacts are those that would have long-term impacts on water quality that may not be mitigated or impacts that are inconsistent with regulatory standards and permit requirements. **Table 4-4-1** provides an overview of anticipated impacts on surface water resources.

TABLE 4.4-1
OVERVIEW OF CONSTRUCTION AND OPERATIONAL IMPACTS ON SURFACE WATER RESOURCES

Alternative	Impact	Significance Determination
Construction		
In-Water	• Potential for runoff and pollutant discharges from use of barges and other construction equipment. • Potential for "frac out" during boring. Excavation could cause short-term increases in turbidity and changes in dissolved oxygen. • Construction would be short term, and BMPs and monitoring programs would be implemented as required by permits to ensure short-term increases in lake and stream turbidity, temperature, and pollutant discharges meet water quality standards.	Less than significant
On-Shore	• Potential for "frac out" during boring. Potential for turbid site runoff, which could increase sedimentation and turbidity and decrease dissolved oxygen in surface water. • Runoff also has potential to contain other contaminants, such as fuels, oil, metals, and organic compounds from construction operations into surface waters. • All construction would be temporary, and BMPs would be implemented to contain runoff, turbidity, and erosion.	Less than significant
Upland	Similar to impacts described for the On-Shore Alternative.	Less than significant
No Action	Potential for emergency construction if there is a system failure. Construction impacts would be similar to those described above.	Less than significant
Operation		
Common to All Action Alternatives	Reduced risk of system failure; however, system failure cannot be totally eliminated.	Less than significant Potentially significant if a system failure occurred.
No Action	Highest risk of system failure that could release untreated wastewater and could affect water quality.	Potentially significant

4.4.1 What are the potential construction impacts on surface water?

This section describes the types of impacts that could occur on water resources within the Plan area during construction of the Management Plan alternatives. The primary difference among the alternatives is their location (in-water, on-shore, or upland).

Impacts Common to All Alternatives

All construction methods could result in impacts on water resources from stormwater and runoff, turbidity, and the release of pollutants from construction equipment and sediments.

In-Water Alternative

The In-Water Alternative could require the use of barges for access to areas that are difficult to reach by land. Runoff could be introduced into Lake Washington from the barge as it would be a large impervious surface. However, the use of proper BMPs to control runoff would be implemented (see Chapter 5). Therefore, impacts on water resources from the use of barges would be **less than significant**.

Construction of the In-Water Alternative could affect the surface water quality of Lake Washington and its tributaries. Trenchless methods would access sections of the pipeline within Lake Washington by either maintenance holes or by constructing a new maintenance hole for existing lines, which would involve boring to the pipeline through the earth. Risks of boring include a "frac out" where boring fluid escapes the planned route and could potentially release large volumes of bentonite or other drilling fluid into surface waters, which would cause turbidity in surrounding surface waters. New access points could be located within Lake Washington or in on-shore areas. Excavation could result in temporary increases in turbidity from disturbed soils or sediments. BMPs to contain sediment would be required and are described in Chapter 5.

Construction of the In-Water Alternative using open cut methods would have a higher probability of affecting surface water quality through in-water work in Lake Washington and its tributaries than trenchless construction methods. Open cut methods could include the installation of a new pipe within the current alignment or a new alignment at a different location to be more consistent with the existing landscape and improve access for maintenance.

Accessing the sewer via methods that would disturb sediment in Lake Washington, specifically those using open cut methods, could result in short-term increases in turbidity and decreases in dissolved oxygen (DO) within Lake Washington and its tributaries. However, impacts associated with turbidity and subsequent impacts on DO levels would be short-term and spatially limited due to the lack of circulation in Lake Washington and the implementation of BMPs. Excavation in Lake Washington and its tributaries would likely require in-water work using a derrick crane with a clamshell bucket or excavator on a barge. Excavation could also require dewatering of construction areas. It is more likely that construction would utilize a derrick crane or excavator on a barge rather than isolating the work area and dewatering for most of the alignment. However, certain complex connections would likely require dewatering.

Dewatering in Lake Washington for construction projects would include isolating the work area by the installation of sheet piles or cofferdams. Dewatering of the isolated work area using pumps may also be necessary. Any dewatering pumps used would have WDFW-compliant screens on the intake hoses (to prevent fish impingement or entrainment), and depending on the water quality, quantity, and site constraints, all water would be discharged to existing sewer lines or surface water discharges would occur within a turbidity curtain to comply with state water quality standards. In addition, after partial drawdown of the water level behind the cofferdam, and prior to in-water excavation, a qualified biologist would remove fish and aquatic life from the work area and relocate these organisms back to the lake. The implementation of fish exclusion and fish removal/relocation would substantially reduce the potential of negative impacts on resident fish.

If instream work in the tributaries of Lake Washington is required, construction would use a derrick crane or excavator on a barge or the stream would be temporarily bypassed through a high-density polyethylene pipe, or similar flexible plastic pipe. The work area would be isolated using sheet piles or cofferdams, sand bags, or supersacks, and any fish present would be removed and relocated. Due to the small size of tributary streams potentially affected, the bypass would likely be less than 24-inch diameter and accommodate the 2-year annual flow that occurs within the approved in-water work window. The installation and removal of in-water construction equipment would generate short-term and localized increases in suspended sediments and turbidity in the lake and streams.

It is possible that contaminated sediment could be encountered during excavation, but proper BMPs for handling and disposal of sediments as described in Chapter 5 would be implemented. However, existing clean-up site information indicates that there are no known areas with contaminated sediment in the Plan area, so it is unlikely it would be encountered. The operation of heavy machinery within Lake Washington and its tributaries has the potential for pollutants such as diesel, gasoline, oil, grease, and hydraulic fluid to enter surface waters. BMPs (as described in Chapter 5) would be implemented to reduce the risk of leaks and spills.

In-water work activities would be performed under the regulation of WDFW's Hydraulic Project Approval (HPA) and a Corps Section 404 permit, which would include requirements for erosion, sediment, and pollution control measures to be implemented during and after in-water construction. Additionally, the work would be performed under the regulation of a Section 401 (Clean Water Act) Water Quality Certification from Ecology. The Section 401 Certification would include additional conditions related to water quality protection as well as for monitoring turbidity during in-water work to ensure that water quality standards are met and work is stopped if permitted thresholds are exceeded. The isolation of the in-water work area and bypassing of flows around the work area would be the most important BMP for in-water work. The permits would restrict the timing of in-water work activities to WDFW and Corps-prescribed in-water work windows (Table 4.5-2).

With appropriate control measures and monitoring programs in place and as required by permits, construction-related short-term increases in lake and stream turbidity, temperature, and pollutant discharges would meet water quality standards. Impacts would be short-term because the in-water construction duration will be project-dependent, but permit conditions will require work to be

completed within the in-water work window and comply with all permit conditions. Therefore, the In-Water Alternative using open cut and trenchless construction methods would have **less-than-significant** impacts on water quality.

On-Shore Alternative

Trenchless construction methods would have little to no impact on surrounding surface waters in on-shore areas since trenchless methods would require minimal excavation. There is a small potential for "frac out" where boring fluid escapes the planned route and could potentially release large volumes of bentonite or other drilling fluid. As described above for the In-Water Alternative, the potential for "frac out" would be mitigated through preconstruction planning and monitoring. Open cut construction methods would require substantially more excavation that could result in more impacts; however, BMPs would be implemented to limit impacts.

For construction using trenchless methods, the pipe would be installed from excavated access pits or existing maintenance holes. Accessing the lake line system via existing maintenance holes would cause the least amount of disturbance to surface soil, minimizing the risk of runoff containing sediment. Construction activities in areas around existing maintenance holes include the development of temporary construction entrances and staging activities to provide accessible space for construction equipment to safely load and unload.

Construction methods using open cut methods at project sites would expose bare soils, which would make the sites more susceptible to erosion during rain events. In general, larger sites have a greater potential for releases of turbid site runoff due to the larger area of exposed soils. Surface water runoff could increase sedimentation and turbidity and decrease DO in surface waters if it is allowed to discharge untreated or uncontrolled to surface waters. Runoff also has the potential to carry other contaminants, such as fuels, oil, metals, and organic compounds from construction operations into surface waters. However, BMPs (as described in Chapter 5) would be installed as containment for runoff, turbidity, and erosion, thereby minimizing potential impacts on Lake Washington and its tributaries.

Some dewatering may be required in access holes and open cut trenches if groundwater is present. Water present in these areas would likely be pumped to sedimentation tanks to settle soil particles and could be treated further depending on the water quality and discharge location. Direct rainfall or local drainage into the pipe access areas could also be removed by dewatering.

The amount of dewatering would vary depending on the excavation duration, area, and quantity, and on the groundwater elevation and amount of rainfall, but it is anticipated that open cut construction would require more dewatering than trenchless construction. Dewatered waters would be either discharged to adjacent surface waters or the sewer system, depending on the water quality, quantity, and site constraints.

Where feasible, uncontaminated dewatering water would be discharged to surface waters in accordance with the Construction Stormwater General Permit issued by Ecology, employing BMPs and meeting water quality standards established for stormwater. Highly turbid or contaminated dewatering water would be discharged to the sewer system in accordance with the

Wastewater Discharge Permit issued by King County. Discharges to the sewer system must meet requirements for water quality and quantity established by King County. Alternatively, highly turbid or contaminated dewatering water could be treated to meet water quality criteria and discharged to adjacent surface waters, or it could be trucked off-site for appropriate disposal.

Oils, fuels, solvents, or other construction-related chemicals could leak or spill from equipment during construction, contaminating stormwater that discharges to surface waters. If the spills are large and uncontrolled, the spills could flow to adjacent storm drainage systems, surface waterbodies, or seep into groundwater. The highest probability for spills is at staging areas. Because the On-Shore Alternative is located adjacent Lake Washington and several streams, if spills occurred, they would have a higher probability of impacting surface waters.

Open cut methods would have higher probability of impacting turbidity and DO, due to the greater amount of excavation required when compared to trenchless methods. However, due to the implementation of BMPs, construction using open cut and trenchless methods in the on-shore and upland areas is unlikely to result in any impacts on turbidity and DO in Lake Washington and its tributaries. Although existing clean-up data show that there is not any known sediment contamination, it is possible that contaminated sediment could be removed during excavation. However, proper BMPs as described in Chapter 5 would be implemented for the handling and disposal of contaminated sediment to reduce the risk of the inadvertent release of pollutants.

In summary, impacts on surface waters from the On-Shore Alternative using open cut or trenchless construction methods are considered **less than significant** because impacts would be short term, the City would comply with state and local stormwater permit requirements, and BMPs would be employed to control surface water runoff from project sites. Uncontrolled runoff could occur during heavy rainstorms, but BMPs to contain sediment would minimize impacts.

Upland Alternative

Construction impacts from the Upland Alternative would be similar to those described for the On-Shore Alternatives, including the potential for trenchless and open cut construction. However, no existing sewer system is associated with the LWWLL in upland areas, so there would be no rehabilitation associated with this alternative. The Upland Alternative would also result in the least amount of impacts on surface water resources as it would be the farthest from Lake Washington and its tributaries. Therefore, impacts associated with the construction of the Upland Alternative are expected to be **less-than-significant**.

Pump and Flush Station Improvements

Table 4.4-2 describes the potential impacts on water quality from improvements to lift and pump stations.

TABLE 4.4-2
IMPACTS ON WATER QUALITY FROM CONSTRUCTION IMPROVEMENTS AT PUMP AND FLUSH STATIONS

Lift Station Improvement Options	Impacts	Significance Determination
1) Replacing or upgrading individual components	Likely no impacts on water resources.	Less than significant
2) Significant upgrades. Excluding structure replacement.	Potential impacts on water quality from construction if located within the shoreline of Lake Washington or one of its tributaries. Impacts include stormwater, runoff, turbidity, DO, and release of pollutants into surface waters. BMPs would be implemented to reduce impacts on surface waters.	Less than significant
3) Replacement of the pump/flush station, including the structure	The same impacts as significant upgrades, but would be longer in duration.	Less than significant

No Action Alternative

Under the No Action Alternative, the current lake line would be left in its current condition, leaving it vulnerable to failure in the future.

Construction impacts from emergency repairs to address a failure of the existing lake line could also result in impacts from turbidity and DO. Weather and timing could play a role in the amount turbidity increases during emergency repairs, as heavy rains would increase construction site runoff. DO is already a concern for surface water resources in several locations in the Plan area, so these areas would be especially sensitive to impacts from turbidity changes and runoff caused by emergency repairs.

Overall, emergency repairs to the existing system using trenchless and open cut methods would have similar impacts as those described above for the Action Alternatives. Therefore, impacts from construction related to emergency repairs would be **less-than-significant.**

4.4.2 What are the potential operational impacts on surface water?

Common to all Action Alternatives

Once constructed, none of the Management Plan alternatives would have adverse impacts on water quality. Plan implementation could have beneficial impacts on water quality as it would reduce the likelihood of potentiation LWWLL system failures.

Although the Action Alternatives would reduce the risk of lake water contamination by updating the aging system, the risk of system failure cannot be completely eliminated. If a system failure occurred in or near Lake Washington and its tributaries, it would impact water quality by releasing untreated wastewater, which could degrade water quality and create a public health and safety hazard by releasing bacterial and chemical pollutants. Although highly unlikely to occur, the risk of system failure cannot be eliminated and is considered a **significant** impact.

Pump and Flush Stations

Once construction is complete on the pump stations, operational impacts on water quality would be rare. In the event of a power failure, a backup generator (either one permanently onsite or a portable generator brought to the site during a power failure) would help to mitigate the risk of overflows impacting water quality.

No Action Alternative

As discussed above under construction impacts for the No Action Alternative, the current lake line would be left in its current condition, leaving it vulnerable to failure in the future. The No Action Alternative has the highest probability of failure of all the alternatives. Several sections of the lake line system have less than one-third of their remaining useful life left and need to be replaced within the next decade. Other sections may not need replacement until the mid-2050s; however, as the infrastructure continues to age, it becomes more likely to fail, which could range from small leaks to system failure. A system failure would threaten water quality conditions by increasing the risk of untreated wastewater discharges in the event of a failure.

The failure of the lake line system could release large quantities of untreated wastewater, likely containing high amounts of bacterial and chemical pollutants into surface waters. The bacterial and chemical pollutants could be transported to the environment and ultimately degrade water quality and sediment. Water resource areas that are already impaired from bacterial pollution would be especially sensitive to failures resulting from wastewater flows. Bacterial pollution to surface water also poses a risk to public health and safety, as fecal bacteria can expose individuals engaging in recreation, such as wading, boating, or swimming, to virulent pathogens.

Because of the potential impacts on environmental health and public health and safety from the No Action Alternative, impacts on water quality could be potentially **significant**.

4.5 Fish and Aquatic Resources

This section describes the types of impacts that could occur to fish and aquatic resources within the Plan area during implementation of Plan alternatives. Impacts on fish and aquatic resources are categorized as either significant or less-than-significant. Significant impacts are those that would result in fish mortality or permanently alter habitat conditions within Lake Washington or its tributaries. Impacts are also considered significant if they are inconsistent with existing regulatory standards or permits. **Table 4-5-1** provides an overview of potential impacts on fish and aquatic resources.

TABLE 4.5-1
OVERVIEW OF CONSTRUCTION AND OPERATIONAL IMPACTS ON FISH AND AQUATIC RESOURCES

Alternative	Impact	Significance Determination
Construction		
Common to All Action Alternatives	Potential minor impacts from noise and vibration; however, Lake Washington is in an urban area with high vessel traffic, so construction and vessel noise generated by project construction would be within the range of existing conditions.	Less than significant
In-Water	• Potential for accidental spills of oils solvents, and other chemicals from equipment during construction. Increases in turbidity and changes in dissolved oxygen. • Disturbance of native and nonnative aquatic vegetation, benthic invertebrates, and changes in substrate and bathymetry from excavation. • All work would be temporary, mitigated through BMPs and restored following construction.	Less than significant
On-Shore	• Potential for surface water runoff from construction and excavation at the project sites. • Potential for accidental spills during construction. Potential impacts on riparian and wetland habitat areas. • Impacts would be short-term and mitigated through the implementation of BMPs, with all sites restored post construction.	Less than significant
Upland	Similar to impacts described for the On-Shore Alternative.	Less than significant
No Action	• Potential for construction outside of the in-water work window if LWWLL infrastructure fails. • Potential for greater construction impacts than those listed above due to inability to plan for typical avoidance measures and BMPs if emergency repairs are required.	Potentially significant
Operation		
Common to All Action Alternatives	No impacts expected.	Less than significant
No Action	Impacts on fish and other aquatic resources if the aging LWWLL failed sometime in the future and released untreated wastewater into Lake Washington or its tributaries.	Potentially significant

4.5.1 Fish and Aquatic Resources

Aquatic species include fish, aquatic macroinvertebrates, freshwater mammals, and freshwater bird species in the Plan area. Aquatic habitat includes habitat in Lake Washington and its tributaries (Yarrow Creek, Fairweather Creek, Meydenbauer Creek, Kelsey Creek, and Coal Creek).

Impacts Common to All Action Alternatives

Noise and Vibration

Noise and vibration associated with construction activities in and near Lake Washington and its tributaries could create vibrations in the earth and noise that is transmitted to the water. Noise and vibration from the On-Shore and Upland Alternatives would likely be at a lower level than the In-Water Alternative due to a loss of sound energy when it transitions from one medium to another,

such as earth to water or water to air. Construction activities could affect fish behavior by masking important sound signals; disturbing foraging, spawning, or migration activities; or exposing fish to predators. However, these sounds would be short-term and not lethal to fish and would therefore be **less than significant**. Additionally, no pile driving is expected to occur as a part of the Plan. Lake Washington is in an urban area with high vessel traffic, so construction and vessel noise generated by project construction would be within the range of existing conditions. Additionally, BMPs and permit conditions that include monitoring noise levels would be implemented to minimize impacts related to noise and vibration.

In-Water Alternative

As described in Section 4.4, *Surface Water Resources*, construction would result in a potential for accidental spills of oils, solvents, and other chemicals from equipment during construction. If spills occurred during in-water work and are large and uncontrolled, they would flow directly into surface waters and affect aquatic habitat and species. However, the construction contractors would follow the requirements of applicable permits and would implement Spill Prevention and Control Plans for alternatives that require in-water work. Thus, the potential for uncontrolled spills is minimal.

Construction of the In-Water Alternative could also cause increases to turbidity. Increased turbidity could adversely affect adult and juvenile salmonids in the Plan area. Adverse effects could occur if BMPs, described in Chapter 5, are not properly deployed or maintained. The amount of turbidity in the water produces variable responses on fish species. Moderate turbidity levels can improve foraging for salmonids. Turbidity levels between 35 to 150 Nephelometric Units (NTUs) were found to provide the highest observed feeding rates in juvenile Chinook Salmon in marine systems (Gregory and Northcote 1993 in Confluence Environmental Company 2022b). Higher turbidity levels can decrease foraging rates, delay adult migration, or lead to more severe impacts. Foraging rates were found to be reduced when turbidity was greater than 150 NTUs (Gregory and Northcote 1993 in Confluence Environmental Company 2022b). Delay of migration can result in spawning delays, leading to increased energy expenditures, and reductions in spawning success and therefore population size. Other impacts of high turbidity on fish species include impacts on their physical and physiological health (Confluence Environmental Company 2022b). High turbidity can cause gill abrasion from suspended sediment, which is the primary physical effect of turbidity increases on salmonids. High turbidity levels can also put stress on salmonids' physical health and fitness because of detrimental impacts on osmoregulatory functions and blood chemistry (Servizi and Martens 2011 in Confluence Environmental Company 2022b). Trenchless construction methods would not generate high levels of turbidity due to the low level of excavation required and implementation of BMPs. Open cut methods would have a higher chance of creating a more turbid environment from the larger amount of excavation required. However, because of the implementation of BMPs and work only occurring within the designated in-water work windows, turbidity from open cut construction is not expected to affect fish species.

As discussed in Section 4.4, *Surface Water Resources*, an increase in turbidity can cause decreases in DO. However, because construction-related increases in turbidity would be short-

term, localized, intermittent, and isolated from the surrounding area by the use of turbidity curtains, DO levels in areas where fish are present would not be significantly affected.

The level of excavation required for open cut construction methods would result in the temporary displacement of native and nonnative aquatic vegetation, benthic invertebrates, and changes in substrate and bathymetry. Approximately 59,000 linear feet of the existing pipeline is located within in-water areas. If open cut methods are used for replacing all of the existing in-water pipe, it would result in temporary dredging impacts within approximately 37 percent of the Lake Washington shoreline area (WRIA 8 Salmon Recovery Council 2021 in Confluence Environmental Company 2022b). However, construction would be conducted in phases. Additionally, due to other feasible alternatives (including those that use trenchless methods or would relocate the pipeline to on-shore or upland areas), it is unlikely that in-water open cut methods would be used for the entire length. Furthermore, impacts could be reduced by conducting construction in phases and with the use of BMPs. Impacts are also expected to be localized and short-term, with potential for some habitat enhancement or improvements if restoration is prescribed post-construction. See Chapter 5 for proposed restoration following construction. Because impacts would be temporary and the prescribed restoration activities would be completed, impacts on fish habitat are expected to be **less than significant**.

Excavation required for trenchless methods could also result in temporary impacts on native and nonnative aquatic vegetation, benthic invertebrates, and changes in substrate and bathymetry. However, due to the low level of excavation required for trenchless construction methods, it would be at a smaller scale than open cut. The same BMPs, mitigation, and restoration activities for open cut construction would be applied for trenchless construction.

Any dredged materials would be temporarily stored on barges before being transported to Elliott Bay for open-water disposal, pursuant to the Dredged Material Management Office (DMMO) requirements. For sediments that potentially contain New Zealand mudsnails, extra considerations (including decontamination and coordination with WDFW and the Washington State Invasive Species Council) would be required. Most of the Plan area is known to have New Zealand mudsnails present, including Mercer Slough, Coal Creek, and the shoreline of Lake Washington (City of Bellevue 2022b, USDA 2022 in Confluence Environmental Company 2022b).

In-water construction activities—especially those associated with open cut construction methods—could disrupt fish species in Lake Washington, including protected species. Construction that includes in-water work would be scheduled during the approved in-water work window for fish species (**Table 4.5-2**) found in the lake. If dewatering occurs during construction as described in Section 4.4 and fish are present in the work area, they would be removed and relocated by a qualified biologist.

TABLE 4.5-2
PRESCRIBED IN-WATER WORK WINDOWS FOR LAKE WASHINGTON AND SURROUNDING TRIBUTARIES

Species	Location	In-Water Work Window	Agency	
			WDFW	Corps
Sockeye Salmon	Lake Washington – within 100 yards of Sockeye Salmon spawning	July 16–September 30	X	
Salmonids	Lake Washington Tributaries	August 1 – August 31	X	
Salmonids	Lake Washington – Between I-90 and SR-520	July 16–April 30		X
Salmonids	Lake Washington – north of SR-520	July 16–March 15		X
Salmonids	Lake Washington – south of I-90 and within 1 mile of Mercer Slough	July 16–July 31 and November 16-December 31		X
Salmonids	Lake Washington – south of I-90 and farther than 1 mile from Mercer Slough	July 16–December 31		X

SOURCE: Corps (2010), WDFW (2018) in Confluence (2022b)

Of the 59,000 linear feet of the existing in-water pipeline, approximately 21,000 feet are directly adjacent to documented Sockeye Salmon spawning areas (**Figure 3.5-3**). If this section of the pipeline could be abandoned in place and relocated to an on-shore or upland area, it would eliminate potential construction impacts on Sockeye Salmon spawning and the need to perform work within the designated in-water work window. If portions of the existing pipeline require removal or replacement using trenchless or open cut methods, it could result in impacts on Sockeye Salmon spawning areas if it occurred outside the in-water work window. However, construction would only be permitted to occur within the in-water work window, and all disturbed areas would be restored as prescribed following construction.

Overall impacts on fish and aquatic resources associated with trenchless and open cut construction methods would be **less than significant** as all work would be temporary, with in-water construction conducted in phases. The total duration of construction will be project-dependent, but permit conditions will require work to be completed within the in-water work window and comply with all permit conditions, and BMPs would be implemented. Additionally, Plan implementation could have potential long-term beneficial impacts on fish and aquatic resources if additional habitat restoration activities are conducted and long-term water quality is maintained.

Construction activities in Lake Washington and its tributaries could disrupt freshwater mammals such as river otters and freshwater bird species that depend on Lake Washington for foraging including seagulls, ducks, geese, eagle, and osprey; however, species located in these areas have adapted to the urban conditions found in the Plan area and would likely temporally migrate away from construction areas. Impacts on freshwater mammals and avian species would be **less than significant.**

On-Shore Alternative

As described in Section 4.4, surface water runoff from construction and excavation at the project sites could increase sedimentation and turbidity in Lake Washington and its tributaries if allowed to discharge untreated or uncontrolled. Uncontrolled runoff could result in sedimentation of aquatic habitats near the individual project sites, which would affect aquatic species. However, BMPs to control surface water runoff would be employed at all construction sites to comply with state and local jurisdictional stormwater permit requirements. With implementation of the required BMPs, the potential for uncontrolled runoff is minimal.

Additionally, as described in Section 4.4, there is potential for accidental spills of oils, solvents, and other chemicals from equipment during construction. If the spills are large and uncontrolled, they could flow to adjacent surface water and affect aquatic habitats and species. However, the City would follow the requirements of all applicable permits and would implement Spill Prevention and Control Plans for each construction project. Thus, the potential for uncontrolled spills is minimal.

Construction involving open cut methods in on-shore areas has the potential to disturb riparian and wetland habitat areas. Although the Lake Washington shoreline is highly developed and degraded, natural areas (including Yarrow Bay Wetlands, Wetherill Nature Preserve, Beaux Arts Village Wetland, and Mercer Slough Wetland Complex) are present and may be disturbed if trenching is required in these areas. Construction activities involving open cut methods could result in clearing and grading of riparian habitat, which has the potential to reduce the extent of the riparian zone's ability protect surface water by filtering pollutants and provide fish habitat. Disturbance of these on-shore areas could alter adjacent aquatic habitat by creating changes in shading patterns, reducing organic inputs and terrestrial food sources for fish. However, these impacts would be temporary, and restoration would be completed following construction.

On-shore trenchless construction also has the potential to disturb shoreline vegetation and wetlands during maintenance hole access and establishment of staging areas. However, any impacts on the hydrology, water quality, or overall habitat function of wetlands and riparian areas during construction would be minor and offset after construction with site restoration.

Impacts would be short-term and mitigated through the implementation of BMPs. All construction sites would be restored to preconstruction or improved conditions, so it is unlikely that construction would result in long-term impacts on fish and aquatic resources. Therefore, any impacts from the construction of projects using open cut or trenchless methods in on-shore or upland areas would be **less than significant**. On-shore and upland trenchless construction is not expected to have any impacts on freshwater mammals and bird species as they are adapted to urban conditions in the Plan area.

Upland Alternative

Construction impacts from the Upland Alternative would be similar to those described for the On-Shore Alternative, including the potential for trenchless and open cut construction. However, there is no existing sewer system in the upland areas, so all construction under this alternative

would involve installing a new sewer line in this area. The Upland Alternative would also result in the least number of impacts on fish and aquatic resources as it would be the farthest from Lake Washington and its tributaries. Therefore, impacts associated with the construction of the Upland Alternative are expected to be **less than significant**.

Pump and Flush Station Improvements

Table 4.5-3 below summarizes the potential impacts on fish and aquatic resources from improvements to lift and pump stations.

TABLE 4.5-3
IMPACTS ON FISH AND AQUATIC RESOURCES FROM CONSTRUCTION IMPROVEMENTS AT PUMP AND FLUSH STATIONS

Improvement Options	Impacts	Significance Determination
1) Replacing or upgrading individual components	No impacts.	Less than significant
2) Significant upgrades. Excluding structure replacement	Potential for construction site runoff containing sediment and construction solvents; however, BMPs to control surface water runoff would be employed at all construction sites to comply with state and City stormwater permit requirements. Potential noise and vibration could also affect fish and aquatic resources if the lift or pump station is adjacent to Lake Washington or one of its tributaries. However, BMPs and permit conditions that include monitoring noise levels and fish behavior would be implemented to minimize impacts related to noise and vibration.	Less than significant
3) Replacement of the pump/flush station, including the structure	Impacts and BMPs from the replacement of pump/flush stations would be the same as those described for significant upgrades. However, impacts from replacement of the lift/flush station would be larger in scale and require longer construction times.	Less than significant

No Action Alternative

The No Action Alternative could result in impacts on fish and other aquatic resources if the aging lake line system failed sometime in the future and required emergency repairs.

If the lake line fails or is at risk of failure, timely action is critical to reduce the risk of untreated wastewater from entering Lake Washington and impacting fish and aquatic resources. This could require construction and repairs outside of the specified approved in-water work windows, which could require emergency approval from WDFW and the Corps. Construction activities outside the approved work windows could result in higher impacts on juvenile salmonids migrating through Lake Washington, its tributaries, or Elliott Bay. Sockeye Salmon spawning along the shoreline of Lake Washington could also be affected.

Under the No Action Alternative, impacts on fish and aquatic resources from the construction of emergency repairs would be similar to or greater than the impacts of the Action Alternatives described above. Impacts could be greater due to the inability to plan for typical avoidance measures and BMPs if emergency repairs are required. Several areas of Lake Washington have

documented Sockeye Salmon spawning directly adjacent to existing areas with in-water pipe that could be at risk if pipe failure occurs.

Overall, habitat alterations from emergency repairs and turbidity and DO under the No Action Alternative have the potential to have **significant impacts** on fish and aquatic resources if in-water repairs occur outside of the in-water work windows for fish species.

All equipment used during emergency repairs would generate noise that could disrupt fish species if occurring outside of the approved in-water work window. However, since Lake Washington is in an urban setting with high levels of vessel traffic and underwater noise, noise from the operation of tugboats, self-propelled work barges, and trenching may have minor impacts on fish, but are not expected to have long-term impacts on fish health.

4.5.2 What are the potential operational impacts on fish and aquatic resources?

Common to all Action Alternatives

Once constructed, none of the Action Alternatives would have adverse impacts on fish or other aquatic resources.

Pump and Flush Stations

Operation of the pump stations would not result in any impacts on fish or aquatic resources. Plan implementation could result in long-term beneficial impacts as it would reduce the risk or potential lake line system failures, which could have negative impacts on water quality and fish health.

No Action Alternative

Continued operation of the existing sewer system under the No Action Alternative could result in impacts on fish and other aquatic resources if the aging LWWLL failed sometime in the future and released untreated wastewater into Lake Washington or its tributaries. The No Action Alternative has the potential to have **significant impacts** on fish and aquatic resources in the event of a large release.

4.6 Plants and Animals

This section describes the construction and operational impacts that could occur to plants and animal as a result of the implementation of the Management Plan alternatives. Impacts on plants and animals are categorized as either significant or less-than-significant; significant adverse impacts are those that would result in long-term or permanent disruptions to wildlife habitat or permanently clear large swaths of vegetation. Significant impacts would also result from impacts that are potentially inconsistent with regulatory standards and permit requirements. **Table 4-6-1** provides an overview of potential impacts on plants and animals.

TABLE 4.6-1
OVERVIEW OF CONSTRUCTION AND OPERATIONAL IMPACTS ON PLANTS AND ANIMALS

Alternative	Impact	Significance Determination
Construction		
Common to All Action Alternatives	Temporary human disturbance from construction; however, if wildlife species are disturbed, they would likely temporarily migrate away from the construction area. No impacts on vegetation expected, as long as clearing of large areas complies with land and shoreline regulations.	Less than significant. If clearing of large areas occurs without complying with land use and shoreline regulations, it would be considered a significant impact.
On-Shore and Upland Alternatives	Some areas of landscaped vegetation would likely be removed during construction. Small portions of vegetation within natural areas may also be removed. All areas disturbed would be restored following construction.	Less than significant
No Action	Sporadic construction would result in impacts similar to those common to all Action Alternatives and on-shore and upland areas.	Less than significant
Operation		
Common to All Action Alternatives	No impacts expected.	Less than significant
No Action	Construction activities could disrupt wildlife and remove vegetation; however, the Plan area is within an urban environment where species are adapted to human presence and activities.	Less than significant

4.6.1 What are the potential construction impacts on plants and animals?

Impacts Common to All Action Alternatives

Impacts from construction on plants and animals are expected to be minimal because the Plan area is predominantly located within an urban setting with some access to public parks and natural areas dispersed throughout. All the Action Alternatives would result in some level of increased noise and human disturbance in construction areas, which could cause disturbances to wildlife.

If a project requires clearing large areas, particularly in natural areas and cannot comply with existing land uses and shoreline regulations, it could be considered a potentially **significant impact.**

In-Water Alternative

As described above, construction would result in increased noise and human activity, which could disturb wildlife. However, the Plan area is within a developed area where wildlife is adapted to urban conditions. If wildlife species are disturbed, they would likely temporarily migrate away from the construction area. Therefore, impacts from the construction of the In-Water Alternative would be **less than significant** on plants or terrestrial wildlife.

On-Shore Alternative

Project construction in on-shore areas would primarily be located within developed residential parcels. Although these parcels are developed, some areas of landscaped vegetation would likely be removed where boring or trenching is needed to install or access the pipeline for construction. If trenchless access to the pipeline is required within these areas, a small portion of vegetation would likely be removed to reach the pipeline by creating a new access hole. Open cut methods would likely require substantially more vegetation to be removed due to the amount of required excavation. However, all disturbed vegetated areas would be restored following construction.

Increased noise and human presence during construction could displace birds and mammals. However, many wildlife species in urbanized areas are more tolerant of noise and human activities and may not be disturbed. Those species that are disturbed would likely migrate to a neighboring area for the duration of construction. Nesting bald eagles could be disturbed by construction; however, any construction occurring around bald eagle nests would be required to comply with the National Bald Eagle Management Guidelines as described in Chapter 5. After construction is complete in an area, it would be revegetated and returned to preconstruction conditions; therefore, all construction impacts would be temporary.

Impacts on terrestrial vegetation and wildlife from trenchless construction methods for the On-Shore Alternative would be **less than significant** because species in the Plan area are adapted to urban conditions and human disturbance, and construction impacts would be small in scale and dispersed throughout the Plan area.

Upland Alternative

Impacts on plants and animals from the Upland Alternative would primarily be the same as those described for the On-shore Alternative, except that the Upland Alternative would require the installation of all new pipelines as no lake line system pipes are currently located outside of Lake Washington, its tributaries, or the shoreline.

Pump and Flush Station Improvements

Table 4.6-2 summarizes the potential impacts on plants and animals from improvements at the pump and flush stations.

TABLE 4.6-2
IMPACTS ON PLANTS AND ANIMALS FROM CONSTRUCTION IMPROVEMENTS AT PUMP AND FLUSH STATIONS

Improvement Options	Impacts	Significance Determination
1) Replacing or upgrading individual components	Increased human presence and potential construction noise; however, lift and pump stations are in areas where wildlife are adapted to urban conditions. May result in some areas of cleared vegetation that would be restored following construction.	Less than significant
2) Significant upgrades. Excluding structure replacement	Similar to replacing or upgrading individual components, with longer construction times. All disturbed areas would be restored following construction.	Less than significant
3) Replacement of the pump/ flush station, including the structure	Highest potential for vegetation clearing. All disturbed areas would be restored following construction, but construction could last greater than 6 months.	Less than significant

No Action Alternative

Because the No Action Alternative would result in sporadic construction activities, construction-related impacts on plants and animals would be similar to those described above and would depend on the construction location, resulting in **less-than-significant impacts**.

4.6.2 What are the potential operational impacts on plants and animals?

Common to all Action Alternatives

Once constructed, none of the Action Alternatives would have adverse impacts on plants or wildlife, as all disturbed areas would be restored or mitigated post-construction. If a project includes development in a previously vegetated area, it could result in some impacts on vegetation, but these are considered **less than significant** as any changes in vegetated areas would have to be consistent with existing uses and comply with shoreline regulations.

Pump and Flush Stations

Once constructed, pump stations would not have operational impacts on plants or wildlife, as all disturbed areas would be restored following construction.

No Action Alternative

Continued operation of the lake line system without improvements could require repairs and replacement in the future, which would result in construction activities that could disrupt wildlife and remove vegetation. However, these impacts are expected to be **less than significant** as the Plan area is within an urban environment where species are adapted to human presence and activities.

4.7 Noise

This section describes the types of noise impacts that could occur within the Plan area during implementation of the Management Plan alternatives. Noise impacts are documented as either

significant or less-than-significant; significant adverse impacts are those that are potentially inconsistent with regulatory standards and/or permit requirements that may require extensive mitigation measures or situations that could not be mitigated. For example, noise levels are subject to state and local established maximum noise levels permissible within specific districts and noise level restrictions during construction; if standards could not be met, significant impacts could occur. State maximum permissible noise levels in a residential area from a residential district are 55 dBA during the day and 45 dBA at night (WAC 173-60-040). For additional regulatory standards associated with noise impacts, categorized day and night hours, and jurisdiction-specific maximum permissible noise levels, refer to Section 3.7, *Noise*. **Table 4-7-1** provides an overview of potentially anticipated noise impacts.

TABLE 4.7-1
OVERVIEW OF CONSTRUCTION AND OPERATIONAL NOISE IMPACTS

Alternative	Impact	Significance Determination
Construction		
Common to All Action Alternatives	• Potential for noise impacts from stationary or mobile construction equipment, including dewatering and pumping equipment. • Implementation of noise-reducing measures and construction BMPs would minimize noise impacts.	Less than significant
In-Water Alternative	• Open cut or trenchless methods could affect the noise setting in site-specific areas where sections of the pipeline are accessed. • Open cut methods would be at a larger scale and require more excavation, requiring more extended construction times and associated noise.	Less than significant
On-shore and Upland Alternatives	• Similar to impacts described for the In-Water Alternative, noise from construction and restoration would be extended in time and closer to residences. • Implementation of noise-reducing measures and construction BMPs would minimize noise impacts.	Less than significant
No Action	Noise impacts would not exceed existing conditions. Construction BMPs and noise-reducing measures would be implemented to minimize noise impacts.	Less than significant
Operation		
Common to All Action Alternatives	The operational effects of noise associated with any of the Action Alternatives would be minor in the Plan area.	Less than significant
No Action	Minimal noise impacts expected. Maintenance of the facilities would be infrequent and occur only during daytime hours, resulting in a minor source of noise.	Less than significant

4.7.1 What are the potential noise-related construction impacts?

Many of the construction noise impacts would be common to all the alternative construction methods.

Impacts Common to All Action Alternatives

Noise Generated by Construction Equipment and Activities

Construction noise levels vary depending on the type and intensity of activity, with the highest levels of intensity typically occurring during earthwork. The most common noise source in construction areas would be engine-powered machinery such as earthmoving equipment (bulldozers and excavators), material handling equipment (cranes), and stationary equipment (compressors, generators, and pumps). The loudest and most disruptive construction activities would be from driving sheet piles (if required). Installation of shoring for pipes, maintenance holes, and pump station structures would also be a source of construction noise. Other noise sources include tools such as jackhammers. Noise generated by mobile equipment, either on land or water, would occur intermittently between and around construction sites, while stationary equipment would generate sound fairly constantly. Backup alarms from on-site construction vehicles would add to the overall increased noise levels. **Table 4.7-2** presents the predicted noise levels for operation at full power (i.e., loudest condition) for each piece of construction equipment at a distance of 50 feet from the equipment (FHWA 2006).

TABLE 4.7-2
CONSTRUCTION NOISE EMISSIONS REFERENCE LEVELS

Equipment	Maximum Sound Level at 50 Feet (dBA)*
Pile driver (Impact)	101
Concrete saw	90
Jackhammer	89
Cement mixer	85
Excavator	85
Crane	85
Drill rig truck	84
Dump or boom truck	84
Concrete pump truck	82
Generator	82
Street sweeper	82
Pump	81
Backhoe	80
Compressor	80
Front-end loader	80
Pickup truck	75
Welder	74

* Numbers represent loudest noise emission reference level in A-weighted decibels (dBA), either the actual measured level with averaged samples or the Construction Noise Control Specification 721.560 reference level, both at a distance of 50 feet (FHWA 2006).

Noise would also be generated through the temporary bypass piping and pumping necessary during construction around the work site to keep sewage flowing through the lake lines. Noise from the pumping could be consistent through the day and night for the duration of any improvements or emergency actions.

Increased Noise Levels in Residential Areas and near Sensitive Receptors

Sensitive receptors are those building occupants and uses that are most susceptible to noise, such as hospitals and schools. Noise from construction could interfere with activities that require a quiet atmosphere, including sleep if construction occurs at night. Construction noise could also cause impacts on fish and wildlife species (see Section 4.5, *Fish and Aquatic Resources,* and Section 4.6*, Plants and Animals,* respectively). Sensitive receptors in the Plan area are shown in Chapter 3, Figure 3.3-1.

Residential areas are more sensitive to noise impacts than commercial and industrial areas because they tend to have more consistently lower noise levels. Residential neighborhoods typically have baseline noise levels of around 50 dBA. Construction-related noise levels can range from 65 to over 100 dBA during peak activity. For context, normal conversation is approximately 60 dBA, and the noise from lawn mowers can reach up to 100 dBA at 3 feet away (NIDCD 2017). Some residents may be very disrupted by construction noise, and other residents may not be bothered. Specific evaluation of noise levels and impacts would be addressed at the project level when facility sites are known, and site-specific background noise levels can be investigated.

In-Water Alternative

Construction of the In-Water Alternative using open cut or trenchless methods could affect the noise setting in site-specific areas where sections of the pipeline are accessed. In trenchless methods, access would be either through boring down through the soil to the pipe or by using maintenance holes. Using maintenance holes to access the system would not involve extensive truck trips or excavation and would have minimal noise impacts. During trenchless pipe rehabilitation, bypass pumping and truck trips for installation of rehabilitation, such as CIPP installation, would create temporary noise impacts. The trenchless method, using maintenance holes for access, may require specialty equipment at limited access points, temporarily affecting adjacent residential noise levels. Cleaning and jetting of the pipeline would also create short-term noise, if utilized. Increases in noise levels under the trenchless methods for the In-Water Alternative would be limited to the areas where access to the lake line system is required.

Accessing the pipeline in the water would require construction equipment at limited access points, increasing the noise levels in the adjacent areas. Trenchless methods under the In-Water Alternative could require operation from a barge at the access points. Depending on the location of the access points, minor excavation and dewatering may be necessary. Dewatering would require additional pumping equipment, which could increase the noise levels in the nearby areas.

Open cut construction methods would require substantial dewatering and additional equipment necessary for the dewatering at that scale, including dewatering pumps and equipment from the barge, and would add to the noise disruption. Work within the lake would require extensive

material handling and potentially extended periods of time of construction noise to manage the wet and silty conditions during excavation. The import of replacement materials could require additional construction trips and associated noise impacts. The operation of heavy machinery within Lake Washington could potentially increase noise levels in localized areas where access is needed. Additional operation of heavy machinery and equipment would be required for open cut methods and cause noise throughout the linear areas where the pipeline needs to be accessed. Open cut methods would require longer construction durations and associated construction noise. Noise levels would increase for sensitive receptors when construction equipment is closest to adjacent properties.

In summary, construction of the In-Water Alternative using open cut methods would cause impacts similar to those described for the trenchless methods but would be at a larger scale and require more excavation, requiring more extended construction times and associated noise. Although construction noise would be extended in duration and geographically concentrated with open cut methods, all construction would occur using construction BMPs, and noise impacts could be minimized by implementation of noise-reducing measures. Some nearby residents may be very disrupted by construction noise, and other residents may not be bothered. Considering that the noise impacts would be localized to access points during trenchless methods or minimized to the extent practicable during open cut methods and permitted sound levels would unlikely be exceeded, construction-related increases in noise from the In-Water Alternative using open cut or trenchless construction methods would represent noise impacts that are **less than significant**.

On-Shore Alternative

Construction of the On-Shore Alternative using trenchless or open cut methods could affect the noise setting in the areas where sections of the pipeline are accessed. Similar to trenchless methods for the In-Water Alternative, access via maintenance holes would reduce surface disturbance and limit excavation, requiring machinery that could increase noise levels and, if required, excavation duration and associated noise impacts would be minimal.

If boring through the soil is used to install a new pipeline, construction equipment at limited access points would increase the noise levels in the adjacent areas. Minor excavation and dewatering during excavation may be necessary and increase noise levels in the adjacent areas. Increases in noise levels would also be limited to areas where access to the lake line system is required. Noise impacts would be most prominent in areas adjacent to the construction sites and access points and would be localized and short-term. Construction site noise with the On-Shore Alternative would be closer to residences than with the In-Water Alternative. Trenchless methods for the On-Shore Alternatives would be concentrated at fewer locations, require the least amount of noise-generating earthwork, and the length of the construction period would be shorter than open cut methods.

Construction of the On-Shore Alternative using open cut construction methods would cause more concentrated and extended noise impacts. Since construction could include the installation of a new pipe within the current alignment or a new alignment in a different location, noise impacts from construction equipment would occur in geographically larger areas and affect more sensitive

receptors and residences. Construction and excavation at project sites would be extensive and dispersed over longer periods of time, to include restoration of infrastructure following completion of construction, and cause continued noise impacts during construction. The operation of heavy machinery in on-shore areas could cause noise impacts on adjacent properties and would be in close proximity to residents. Construction could require breaking apart the roadway and sidewalk surfaces and restoration and repaving after construction, adding to the duration of time that noise would affect adjacent areas. Dewatering may be necessary during construction due to infiltration, where additional pumping equipment would be needed and could increase the noise levels at construction sites. Imported materials may be needed that would add to the number of barge or vehicular trips and temporary noise from construction trips.

Noise impacts from the On-Shore Alternative using trenchless construction methods would be short-term, localized to access points, and permitted sound levels would unlikely be exceeded. Using open cut methods would require the excavation of sections of pipeline for replacement and result in a longer duration of construction-related noise impacts. Although construction noise would be extended in duration, close to receptors and geographically concentrated, construction BMPs and noise-reducing measures would be implemented to minimize noise impacts. Some residents may be very disrupted by construction noise, and other residents may not be bothered. Additional measures would be taken to minimize impacts on adjacent neighbors and sensitive receptors, as applicable. Considering that the noise impacts would be minimized and permitted sound levels would unlikely be exceeded for extended periods of time, noise from the On-Shore Alternative using open cut or trenchless construction methods would represent **less-than-significant** construction-related noise impacts.

Upland Alternative

Construction impacts for trenchless and open cut construction from the Upland Alternative would be similar to those described for the On-Shore Alternative. However, no existing sewer system is associated with the lake line system in the upland area, and no rehabilitation is associated with this alternative. Short-term localized effects of noise would be expected from construction activities under any of the alternatives; however, the Upland Alternative open cut construction methods would necessitate the loudest and most disruptive construction activities using heavy construction equipment in stationary locations, resulting in the most amount of noise impacts. This is due to the proximity of the noise to the receptors in the upland areas.

Although noise impacts under open cut methods for the Upland Alternative would be most disruptive and longest duration of the alternatives, the use of heavy, loud equipment and truck trips would end once construction is completed and would not be concentrated in any one area over the duration of construction. Construction would be dispersed over many years in many locations, only temporarily affecting adjacent residential and commercial properties located in upland areas. Some residents may be very disrupted by construction noise, and other residents may not be bothered. In combination with the measures indicated for the On-Shore Alternative, construction-related short-term increases in noise impacts from the Upland Alternative utilizing open cut or trenchless construction methods would represent **less-than-significant** impacts.

Pump and Flush Station Improvements

The noise impacts during construction of improvements to pump stations would vary, depending on the type of improvements, construction equipment used, and duration of construction at each lift or pump station. **Table 4.7-3** describes the potential noise impacts for each improvement option.

TABLE 4.7-3
NOISE IMPACTS FROM CONSTRUCTION IMPROVEMENTS AT PUMP AND FLUSH STATIONS

Improvement Options	Potential Impacts	Significance Determination
1) Replacing or upgrading individual components	Few to no noise impacts anticipated; minor noise from transport of materials and minor noise increase during component upgrade for a duration ranging from 1 week to 1 month.	Less than significant
2) Significant upgrades, excluding structure replacement	Potential for noise increase during equipment transport and during upgrades; improvements could require strategies to manage noise duration, intensity, and timing for 4 to 6 months.	Less than significant
3) Replacement of the pump/flush station, including the structure	Moderate amount of construction trips and additional equipment needed to replace structure(s) would create noise impacts, affecting receptors adjacent to the selected site. Improvements may occur either on the existing parcel, depending on site availability, or a new location may be necessary requiring equipment movement and strategies to manage noise duration, intensity, and timing for greater than 6 months.	Less than significant

No Action Alternative

Under the No Action Alternative, existing operational and maintenance strategies would continue to maintain the service life and limit degradation of the existing lake line infrastructure. Operational and maintenance activities to sustain the existing infrastructure and associated noise from equipment would be localized and short-term. Noise generated would be within the range of existing conditions. Any repairs implemented under the No Action Alternative would not likely require high-impact noise equipment. High-impact noise equipment, such as excavation and bypass pumping equipment, may be necessary for unplanned emergency repairs of a failed section of pipe segment and cause short-term noise impacts.

Piecemeal repair and replacement under the No Action Alternative would generally have a limited footprint, would be limited in duration, localized, and be unlikely to create long-term noise impacts outside of permissible levels. Maintenance of the system would be infrequent and occur only during daytime hours, resulting in a minor source of noise. Repairs as part of maintenance, or in response to emergencies, would generate noise during construction or emergency management; associated noise would be short-term. Therefore, the No Action Alternative would result in **less-than-significant** noise impacts.

4.7.2 What are the potential noise-related operation impacts?

Common to All Action Alternatives

The operational effects of noise associated with any of the alternatives would be minor in the Plan area. Pipelines, maintenance holes, and vaults are located underground and do not represent a source of operational noise. All above-grade facilities (i.e., pump stations, generators, storage tanks, etc.) would be designed to comply with the applicable jurisdiction's maximum allowable noise limits and, in all but the quietest of locations, to not exceed existing background noise levels at facility sites. Maintenance of the facilities would be infrequent and occur only during daytime hours, resulting in a minor source of noise. Once constructed, all Action Alternatives would have **less-than-significant** noise impacts during operation.

Pump and Flush Stations

Noise would be generated under all options by pump and flush stations. Pumps generate sound on an intermittent basis, but most of the noise would be contained within the facility vault or housing. All facilities would be designed to comply with the applicable jurisdiction's maximum allowable noise limits and, in all but the quietest of locations, to not exceed existing background noise levels at facility sites. Therefore, the operational noise impacts for pump stations under all Action Alternatives would be **less than significant**.

No Action Alternative

Ongoing operational strategies and piecemeal repair and replacement under the No Action Alternative would not cause noise impacts. Maintenance of the facilities would be infrequent and occur only during daytime hours, resulting in a minor source of noise. Operation of the lake line system after implemented strategies or projects would not generate noise. As such, operational noise impacts of the No Action Alternative would be **less than significant.**

4.8 Transportation

This section describes the types of transportation impacts that could occur with the range of projects proposed as part of the Plan alternatives. Transportation impacts are documented as either significant or less-than-significant; significant adverse impacts are those that are potentially inconsistent with regulatory standards and/or permit requirements that may require extensive mitigation measures or situations that could not be mitigated. For example, construction within public road rights-of-way is subject to required federal, state, and local standards and regulations during design and construction; if standards could not be met, significant impacts could occur. For additional regulatory standards associated with transportation, refer to Section 3.8, *Transportation*. **Table 4.8-1** provides an overview of potential impacts on air quality.

TABLE 4.8-1
OVERVIEW OF CONSTRUCTION AND OPERATIONAL IMPACTS ON TRANSPORTATION

Alternative	Impact	Significance Determination
Construction		
In-Water	• Potential for transportation impacts from construction trips and road closures. • Measures would be taken to maintain access in residential areas to the extent practicable.	Less than significant
On-Shore	• Potential for transportation impacts from construction trips and road detours or closures, potentially on residential roadways. • Sidewalks, bike routes, street parking, or parking on private property along roads where construction may occur may be affected. • Measures would be taken to coordinate with transportation services and residents to minimize disruption, and roadways and sidewalks would be restored to their original or better condition.	Less than significant
Upland	Similar to impacts described for the On-Shore Alternative. • Impacts on vehicular transportation, parking, and non-motorized methods of travel would be longer in duration. • Detours and closures may be of a longer duration for construction and restoration. • Additional measures would be taken to maintain access in residential areas to the extent practicable.	Less than significant
No Action	Minimal impacts from individual actions constructed under these strategies, which generally have a limited footprint and duration and are unlikely to create noticeable transportation impacts.	Less than significant
Operation		
Common to All Action Alternatives	Minor impacts on transportation from vehicle trips generated by facility maintenance. None of the improvements are expected to affect transportation operations.	Less than significant
No Action	Occasional maintenance and inspection would generate a small number of localized vehicle trips.	Less than significant

4.8.1 What are the potential construction impacts on transportation?

The types of transportation impacts that could be expected from implementation of the Management Plan alternatives are described in general terms, but site-specific impacts are not evaluated in this programmatic EIS. Site-specific, project-level transportation analysis would be conducted prior to implementation of each individual project.

Impacts Common to All Action Alternatives

The primary difference among the Action Alternatives is their location (in-water, on-shore, or upland) and construction method (trenchless rehabilitation, trenchless new pipe construction, or open cut). Many of the potential construction-related impacts on transportation would be common to all the alternative construction methods.

Construction Truck Trips and Barge Use

Construction activities that generate truck trips include mobilization of construction equipment and materials to the site, transport of excavated material away from the site, and demobilization of construction equipment away from the site when construction is complete. The expected number of truck trips generated by construction activities would vary primarily based on the level of earth excavation and disposal of materials and construction equipment needed. For example, open cut construction would generate significantly more truck round trips to manage and dispose of excavated material and move necessary equipment to and from the construction site. The duration over which construction-generated traffic occurs also would vary. Some projects may require 1 year or less to construct, while pump station replacement projects may require up to 2 years. Transportation by barge of excavation material, fill, aggregate, and other bulky items at shoreline sites could reduce roadway congestion. Barge trips would not affect any on-land or in-water transportation, including recreational, and would comply with applicable Coast Guard requirements. Coordination with affected homeowners would occur prior to mooring any barges to minimize impacts on private water vehicles and shore access.

Construction truck routes typically follow the most direct paths to and from the regional highway system using arterial streets. Construction transportation is often limited during commuter peak periods (typically the most congested hours of the day) to reduce construction truck delays due to commuter congestion and in some cases to minimize their impact on roadway operations. The additional construction trips are not expected to adversely affect roadway operations and would not likely be noticeable to other drivers on arterials and the regional highway system. Since there are limited roadways to access sections of the lake line system, some construction trips may directly affect residents who need access to their properties on the same roadways and driveways necessary for construction trips.

Construction Employee Commute Trips

Construction activities generate commute trips for construction workers who travel to and from the sites. Because the neighborhood areas are located in urban settings where parking may be limited, construction employee vehicle trips would likely be limited only to the number that can park within the construction staging area, and on area streets. Some workers may either travel via transit or be shuttled from an off-site location, such as a park-and-ride lot, if parking is limited.

Road Closures and Associated Traffic, Transit, Non-Motorized Impacts, and Parking Impacts

Since the lake line pipes are located within or adjacent to the water, on private property, or in roadway rights-of-way, excavation beneath roadway lanes on existing streets will be required in some locations. To access the pipeline and system infrastructure, some traffic lanes might need to be temporarily closed. In addition, construction could temporarily reduce on-street parking, require transit route detours, and require closure of sidewalks and bicycle lanes within or adjacent to the project footprint. The potential for impact varies depending on the street type. For example, many local access streets are narrow (often 25 feet wide), so lane closures would affect on-street parking in the vicinity of construction activities. In addition, local access streets typically have a

higher density of driveways, so maintaining access to homes and businesses during construction would typically be more challenging on local access streets than on arterial streets.

For arterials with more than one lane in each direction (including both travel and parking lanes), it may be feasible to close one or more lanes and still maintain traffic flow on the roadway without requiring a detour. However, arterial streets also carry higher traffic volumes and provide the primary means for vehicle traffic traveling through a neighborhood. Transit routes and stops are typically located on arterial streets. Lane closures on high-volume arterials can result in congested conditions and traffic delays. Arterials also provide local access (via driveways) to homes and businesses located along them; lane closures and street excavation must be implemented in a way that maintains local access to adjacent properties. Pavement on arterial streets is typically designed to carry higher traffic volumes and heavier vehicles, so it would better accommodate construction truck traffic.

Neighborhoods with a limited number of route alternatives, such as those that do not have a grid network of arterials or local access streets, would likely be more severely impacted by lane or road closures. Lane closures or full closures of streets in these areas could result in adverse impacts on residents and businesses.

Depending on the characteristics of a road, construction within a traffic lane could require that the sidewalk and/or bicycle facilities adjacent to the segment under construction be narrowed or closed temporarily. If sidewalks are present on both sides of a street, pedestrians could be detoured to the sidewalk across the street. If not, a pedestrian pathway would need to be delineated that separates pedestrians from construction activities. All sidewalk detour infrastructure would adhere to the Americans with Disabilities Act (ADA) accessibility guidelines and be ADA compliant. Special accommodations would be needed to retain pedestrian access to homes and businesses along the construction route if a sidewalk is closed. If a street has a separate bicycle lane or marked shared lanes (sharrows), it may experience a higher level of bicycle traffic. Regardless of whether marked bicycle facilities exist, lane closures and detours would also need to be designed to safely accommodate bicycle traffic.

If a lane closure occurs on a street with transit service, transit routes may need to be detoured. Transit stops may need to be temporarily closed or relocated. In addition, special accommodations would be needed if construction occurs within streets with transit infrastructure.

On-street parking would likely need to be prohibited along a roadway segment under construction. This would reduce the publicly available parking supply in the area during the construction period. The level of impact from a reduction of on-street parking supply would vary depending on the neighborhood. For neighborhoods where on-street parking is the primary source of supply and parking utilization is high, the impact would be greater. In neighborhoods with excess available on-street parking supply, the impact would be minimal.

In-Water Alternative

Construction of the In-Water Alternative using trenchless or open cut methods would affect the transportation network in areas where sections of the pipeline are accessed. For trenchless

construction, access would be either through boring locations or using maintenance holes. The trenchless method of construction would require truck trips for potential minor excavation and movement of materials and equipment to and from access points. Excavation would not be necessary in city arterials or residential streets unless they are directly adjacent to the access point(s). Excavation for trenchless methods would be minimal and only at locations where the pipes need to be accessed in-water, which would minimize the number of trips needed either on water or on land to transport excess materials. Excavation may also be necessary at side-sewers and may require minimal roadway closures.

Trenchless methods would have the least amount of traffic impacts. The construction trips needed would not affect roadway operations on city arterials or likely be noticeable to other drivers. Specialty equipment may be necessary under this method and would need to be moved to limited access points, temporarily affecting adjacent residential roadways and pedestrian paths. Street lanes and sidewalks adjacent to the boring locations would potentially need to be closed or narrowed during construction. For the trenchless method, construction trips may be performed using a barge to transport equipment and materials. The use of a barge during construction could reduce the number of roadway closures and detours necessary. Since the construction work would occur in-water or along the shoreline of the lake, impacts on the transportation system, specifically the residential streets used to access the system, would primarily occur for shorter duration and to a lesser extent as compared to open cut methods under the Upland or On-Shore Alternatives. Trenchless methods in-water are not expected to have adverse impacts on parking, transit, or non-motorized methods of transportation. The number of construction trips required would be fewer than necessary under open cut methods, and construction-related detours would be short-term and localized to access points. Construction with trenchless methods would be of short duration, localized, and would have minimal transportation impacts. Trenchless methods would involve a smaller construction footprint, which would result in short-term construction trips and fewer required closures and detours.

Construction of the In-Water Alternative using open cut methods would affect the transportation network through construction trips and road closures in the areas where the extended linear sections of pipeline are accessed. Open cut methods would require excavation of more material as compared to trenchless methods and more construction trips for material handling and movement of equipment. The additional truck trips and management of materials may require that local roadways be closed at access sites. This method would likely require the replacement of materials with imported materials, requiring additional trips. Work may occur from a barge to manage the materials, reducing the number of truck trips on land.

The additional trips needed for open cut construction versus trenchless construction would not be above typical background traffic on city arterials or likely be noticeable to other drivers. Construction transportation would be limited during commute hours to minimize effects to roadway operations during these times and could be limited in residential areas at certain key transportation times. Residential streets used to access the lake line system during open cut methods in-water could be subject to roadway closure and detours during transport of materials and large heavy equipment. It is possible that street lanes and sidewalks adjacent to the in-water work would need to be closed or narrowed during construction. Open cut methods of construction

under the In-Water Alternative would have limited adverse impacts on parking, transit, and non-motorized methods of transportation. The number of construction trips required would not likely affect transit operations, and parking would likely be located off-site given site constraints at access points. Construction with open cut methods would have an extended duration at any given location as compared to trenchless methods, but impacts would be localized to access areas for the In-Water Alternative. Overall, open cut methods would affect the roadway system along the length of the section of lake line infrastructure being accessed, where closures and restrictions would be necessary to transport equipment to perform in-water work.

For both trenchless and open cut construction methods, measures would be taken to maintain access in residential areas to the extent practicable. Construction-related impacts on transportation associated with open cut or trenchless construction methods with the In-Water Alternative would be **less than significant**.

On-Shore Alternative

Construction of the On-Shore Alternative using trenchless or open cut methods would affect the transportation network in areas where the access points to the lake line system are located. Construction in on-shore areas using trenchless methods would be primarily located within developed residential parcels and potentially in the roadways, depending on the location of the access point(s). The trenchless method of construction would require truck trips for minor excavation and movement of materials and equipment to and from access points. Since improvements to infrastructure would generally be located between private property and Lake Washington, construction trips would be concentrated in those areas and may temporarily affect the neighborhood roadways. In addition to truck trips generated by excavation at the access locations, excavation would be required at all side-sewer connections and require truck trips.

Construction trip increases for trenchless construction are not expected to affect roadway operations on highways or on city arterials or likely be noticeable to other drivers. As such, these construction methods in on-shore areas are not likely to affect transit operations. In areas where access is only available on residential streets, the street lanes and sidewalks may need to be closed or narrowed during construction. If residences have driveway parking along roadways where construction would occur, their parking may not be affected. Since some residences use street parking or parking on the side of the road on private property along roads where construction may occur, parking could be affected for the duration of construction on the roadway. If sidewalks on the roadways provide access to the lake line system components, pedestrians may be detoured to the sidewalk across the street, if possible, or sidewalks may be closed to the public other than for access to residences.

Open cut construction methods would require more excavation and more trips for importing materials. Construction of the On-Shore Alternative using open cut methods would affect transportation through the increased amount of construction trips required and broader access needed at construction sites. Construction trip increases are not expected to affect roadway operations on highway or arterials roadways; however, they could be noticeable to other drivers on collector arterials and local roadways. Within the residential and local streets, construction trips would likely affect residential access and require detours and closures. The number of

construction trips required would not likely affect transit operations. Depending on the access location, the potential volume of trucks could require supplemental traffic control (such as flaggers, signage, or temporary signals).

Since the construction sites are in residential areas and extended construction trips would be required, vehicular transportation, parking, and non-motorized methods of travel would likely be interrupted in area neighborhoods. Under the open cut method, construction may need to occur in the roadway where the roadway may be narrowed or closed for a period of time. Open cut construction could require breaking apart the roadway and sidewalk surfaces and restoration and repaving after construction, adding to the duration of time that transportation services would be affected. New pipeline infrastructure may also be needed along residential streets and arterials, adding to construction trips and possible road closures, or narrowing. Construction trips may directly affect residences who need access to properties on the same roadways necessary for construction trips. Access to driveways in areas adjacent to the construction sites may be limited. The extended duration of open cut construction with the On-Shore Alternative would likely require potential long-term road closures and longer limitations to street parking and non-motorized access in residential areas.

In summary, construction with trenchless methods would be of short duration, localized to access areas, and would have minimal transportation impacts. Trenchless methods would involve a smaller construction footprint, short-term, localized construction trips, and fewer required closures and detours than open cut methods. Construction with open cut methods would require extensive excavation and an associated increase in construction trips, a longer duration of construction, and affect access and transportation in residential areas during construction. Measures would be taken to coordinate with transportation services and residents to minimize disruption, traffic controls and safety measures would be implemented, and roadways and sidewalks would be restored to the original or better condition upon construction completion. Additional measures would be taken to maintain access in residential areas to the extent practicable. In conjunction with these measures, construction-related impacts on transportation associated with trenchless or open cut construction methods with the On-Shore Alternative would be **less than significant**.

Upland Alternative

Construction impacts from trenchless and open cut construction under the Upland Alternative would be similar to those described for the On-Shore Alternative. However, no existing sewer system is associated with the lake line system in the upland area and there would be no rehabilitation. The Upland Alternative open cut construction method would result in the most amount of transportation impacts due to the location of construction located in public right-of-way and impacts to private property for lateral side-sewers; the construction locations would likely have more parking impacts and require a longer duration of roadway detours and closures than the other alternatives. However, in combination with the measures indicated for the On-Shore Alternative, construction-related short-term transportation impacts from the Upland Alternative utilizing open cut or trenchless construction methods would be **less than significant**.

Pump and Flush Station Improvements

The impacts on transportation services during the construction of improvements to pump and flush stations would vary depending on the type of improvements selected at each pump or flush station, generally with more transportation impacts when more extensive improvements occur and more trips are required.

Pump stations would be located on City or private property outside of the road right-of-way and generally would not require extensive excavation in roadways. The pump station improvements would generate truck trips in the neighborhoods where they would be constructed, and the noticeability of the trips would depend on the construction duration. Street lanes and sidewalks adjacent to the sites might need to be closed or narrowed during construction of connections. **Table 4.8-2** describes the potential impacts on the transportation system for each improvement option.

TABLE 4.8-2
IMPACTS ON TRANSPORTATION FROM CONSTRUCTION OF IMPROVEMENTS TO PUMP AND FLUSH STATIONS

Improvement Options	Potential Impacts	Significance Determination
1) Replacing or upgrading individual components	Few to no impacts on transportation; minimal transport of materials and negligible noticeability on roadways during component upgrade for a duration ranging from 1 week to 1 month.	Less than significant
2) Significant upgrades, excluding structure replacement	Potential for numerous construction trips for material and equipment transport; improvements could require construction trips on the same roadway for 4 to 6 months.	Less than significant
3) Replacement of the pump/flush station, including the structure	Moderate amount of construction trips to replace structure at the stations, which could temporarily affect roadway access. Improvements may occur either on the existing parcel, depending on site availability, or a new location may be necessary requiring additional construction trips and road closure for greater than 6 months, where mitigation measures would reduce impacts on vehicular and non-motorized travel.	Less than significant

No Action Alternative

Under the No Action Alternative, the City would continue with existing operational and maintenance strategies to maintain the service life and limit degradation of the existing wastewater lake line infrastructure. Since the wastewater system would be left in place for all repairs, construction activities could require temporary lane closures and detours. These projects could also generate a small number of construction truck trips. Individual actions constructed under these strategies generally have a limited footprint, would be limited in duration and localized, and are unlikely to create noticeable impacts on transportation services. Disturbances to non-motorized travel methods, parking, or transit operations would be minimal and would be short-term. Therefore, the No Action Alternative would result in **less-than-significant impacts** on transportation services.

4.8.2 What are the potential transportation-related operational impacts?

Common to All Action Alternatives

Overall, the operational effects from vehicle trips generated by facility maintenance under all Action Alternatives would be minor. Once constructed, none of the selected improvements are expected to affect transportation operations. Impacts on transportation from utility facilities are largely limited to transportation related to routine maintenance of facilities and inspection. These activities generate relatively few trips per month.

When constructed, most of the infrastructure would be located underground and be physically separated from transportation infrastructure and services. Transportation infrastructure disrupted during construction would be restored, and streets disturbed during construction would be repaved. Occasional maintenance and inspection would be required at these locations, which could generate a small number of localized vehicle trips. Visits by maintenance staff would occur at the same rate as current conditions, unless site conditions warrant more frequent monitoring, resulting in additional trips of likely only one vehicle. The frequency and number of vehicles represent a small portion of the overall traffic in the Plan area and would not affect roadway operations. Therefore, the operational effects on transportation under all Action Alternatives would be **less than significant**.

Pump and Flush Stations

Operation of the pump stations after the selected improvements would not affect transportation services in the Plan area. Pump stations would require regular maintenance and generate a small number of localized vehicle trips per week. These trips would not affect or be noticeable to local traffic operations or other modes of transportation. Therefore, the operational effects would be **less than significant** on transportation for the pump station improvements.

No Action Alternative

Occasional maintenance and inspection would be required of the sewer system, which could generate a small number of localized vehicle trips. These trips would occur infrequently and would not affect roadway operations. As such, operational impacts of the No Action Alternative would be **less than significant** on transportation services in the Plan area.

4.9 Cultural Resources

This section describes the types of impacts on potential cultural resources that could occur with the range of projects proposed as part of the Plan alternatives and construction methods. Impacts on cultural resources are documented as either significant or less-than-significant; significant adverse impacts are those that are potentially inconsistent with regulatory standards and/or permit requirements that may require extensive mitigation measures or situations that could not be mitigated. Proposed plans that involve any ground-disturbing activity should be reviewed by a professional archaeologist on a case-by-case basis.

4.9.1 What are the potential construction impacts on cultural resources?

This section describes the types of impacts that could occur on cultural resources within the Plan area during construction of the Management Plan alternatives.

Impacts Common to All Action Alternatives

As indicated by state and county archaeological predictive models, the Plan area is considered to be at a high risk for containing precontact-era archaeological resources (DAHP 2010; Kopperl et al. 2016). Given the nature and history of land use and development across the Plan area, there is generally a higher probability of encountering historic-era cultural resources below the ground surface than there is to encounter precontact-era cultural resources. There are, however, both precontact and historic period resources documented on the lakebed of Lake Washington. Regarding historic built environment resources, all alternatives would result in some level of temporary visual and/or auditory impacts; however, these impacts are temporary and would not cause any permanent impacts on documented historic built environment resources. All alternatives involving ground disturbance have the potential to impact buried cultural resources, which are non-renewable. Without protection measures, this could result in a **potentially significant** impact.

In-Water Alternative

As indicated above, construction would result in temporary auditory and visual impacts on above-ground cultural resources. As these impacts are temporary, impacts on terrestrial cultural resources from the construction of the In-Water Alternative would be **less than significan**t. There have been no prior cultural resources identification efforts, nor are there any documented submerged cultural resources near the In-Water Alternative area. It is possible for construction activities to encounter unidentified cultural resources if impacts on the lakebed are proposed. Although a few portions of the Plan area retain higher archaeological potential than others, present-day lake levels are considerably lower than those documented prior to the 1916 Montlake Cut. Cultural materials, if present, would be expected on or near the ground surface atop the exposed/former shorelines of Lake Washington. As such, impacts on buried cultural resources from the construction of the In-Water Alternative are considered **potentially significant.**

On-Shore Alternative

Project construction in on-shore areas would primarily be located within developed residential parcels where the extent of prior ground disturbance from historic and modern development across the Plan area is varied. It is possible that several portions of the Plan area may retain undisturbed and intact subsurface deposits with the potential to yield cultural resources. The current shoreline and adjacent upland areas are considered to retain the highest potential for containing buried cultural resources. The probability for encountering/disturbing buried cultural resources is largely correlated with geologic landforms. Any construction work associated with the On-Shore and Upland Alternatives is expected to occur in the following geologic landforms that are considered more likely to encounter/disturbed buried cultural resources: younger alluvium where Meydenbauer Creek empties into Lake Washington (at the south end of the

Meydenbauer Bay Service Area); peat deposits where Mercer Slough empties into Lake Washington (at the south end of the Killarney Service Area); and younger alluvium where Coal Creek drains into Lake Washington (in the Newport South Service Area).

Given the variability in land use history, geologic landforms, and the documented extent of prior ground disturbance as they relate to archaeological probability, any proposed ground disturbance area should be reviewed by an archaeologist to determine the likelihood for encountering and/or disturbing cultural resources. Construction methods, such as open cut trench excavation, boring explorations, or activities that will otherwise generate spoils, are considered to pose a potential impact on cultural resources that may potentially be present in the Plan area. For this reason, impacts on cultural resources from the construction of the On-Shore Alternative could be **significant**; however, proposed disturbance areas should be reviewed by an archaeologist first to determine and conduct the appropriate cultural resources identification and protection measures (refer to Chapter 5).

Upland Alternative

Similar to the On-Shore Alternative, the Upland Alternative project construction would primarily be located within developed residential parcels where the extent of prior ground disturbance from historic and modern development across the Plan area is varied. Impacts on cultural resources from the construction of the Upland Alternative could be **potentially significant**; however, proposed disturbance areas should be reviewed by an archaeologist first to determine the appropriate cultural resources identification and protection measures (refer to Chapter 5).

Pump and Flush Station Improvements

Temporary auditory and/or visual impacts on documented cultural resources (notably built environment resources) may occur as a result of lift and pump station improvements; however, these impacts would be temporary and are not considered significant. The construction of new above-ground infrastructure and consideration of its potential to visually impact built environment resources should be addressed on a case-by-case basis.

Any construction project that directly involves ground disturbance resulting in large areas of soil exposure and/or soil removal retains the potential for encountering and/or disturbing cultural resources. Potential impacts on buried cultural resources from activities associated with improvements to pump and flush stations could be considered **potentially significant** for the same reasons described for the On-Shore and Upland Alternatives. As a result, proposed disturbance areas should be reviewed by a professional archaeologist prior to construction to determine and conduct the appropriate cultural resources identification and protection measures.

Operation impacts on cultural resources are not anticipated expected with any of the alternatives.

TABLE 4.9-1
IMPACTS ON CULTURAL RESOURCES FROM CONSTRUCTION OF IMPROVEMENTS TO PUMP AND FLUSH STATIONS

Improvement Options	Potential Impacts	Significance Determination
1) Replacing or upgrading individual components	Few to no impacts on cultural resources.	Less than significant
2) Significant upgrades, excluding structure replacement	Few to no impacts on cultural resources.	Less than significant
3) Replacement of the pump/flush station, including the structure	Any construction project that directly involves ground disturbance resulting in large areas of soil exposure and/or soil removal retains the potential for encountering and/or disturbing cultural resources.	Potentially significant

No Action Alternative

Because the No Action Alternative would result in sporadic construction activities, construction-related impacts on cultural resources would be similar to those described above and would depend on the construction location. Any proposed construction actions, their footprint, and the maximum vertical and horizontal limits of ground disturbance should be reviewed by an archaeologist to determine the appropriate cultural resources protection measures. As such, impacts associated with the No Action Alternative could be considered **potentially significant.**

4.9.2 What are the potential operational impacts on cultural resources?

Common to all Action Alternatives

When constructed, infrastructure associated with the Action Alternatives is not expected to impact and/or disturb buried cultural resources. Unless maintenance of infrastructure involves construction/ground-disturbing activities supplemental to areas previously disturbed from initial construction, operational impacts are considered **less than significant** for all Action Alternatives. Generally, it is advised that any ground disturbance related to operations be reviewed by an archaeologist first to determine the appropriate cultural resources protection measures, if any.

Pump and Flush Stations

Operation of the lift and pump stations after the selected improvements would not affect cultural resources in the Plan area. Maintenance of this infrastructure is not expected to incur additional ground disturbance nor is it expected to result in construction elements with the potential to incur permanent visual impacts on cultural resources. Therefore, operational effects are considered **less than significant** on cultural resources.

No Action Alternative

Continued operation of the lake line system without improvements could require repairs and replacement in the future, which would result in construction activities that could incur ground disturbance outside of previously disturbed areas. Temporary visual and auditory impacts may

occur as a result of infrequent maintenance activities; however, these impacts are considered **less than significant.** Should maintenance/replacement of failing elements entail ground disturbance outside of their existing footprint, the nature of this work should be reviewed by an archaeologist first to determine the appropriate cultural resources protection measures, if any.

4.10 Public Utilities

This section describes the types of impacts that could occur to public utilities from the construction and operation of the Management Plan alternatives. Impacts on utilities are categorized as either significant or less-than-significant; significant adverse impacts are those that would result in long-term interruptions to utility services (sewer, electricity, natural gas) or those that are inconsistent with regulatory standards or permit requirements. **Table 4-10-1** provides an overview of potential impacts on public utilities.

TABLE 4.10-1
CONSTRUCTION AND OPERATIONAL IMPACT OVERVIEW ON PUBLIC UTILITIES

Alternative	Impact	Significance Determination
Construction		
Common to All Action Alternatives	Require coordination with other utility providers including electrical power, cable, natural gas, storm and sanitary sewer, water, and others to avoid impacts.	Less than significant
No Action	The same as Common to All Action Alternatives	Less than significant
Operation		
Common to All Action Alternatives	Improve infrastructure, which would improve the overall function of the system and reduce the risk of potential failures. Failure is highly unlikely due to improvements but cannot be eliminated.	Although unlikely, potentially significant if pipe failure occurs
No Action	System failure are more likely as the lake line system continues to age, which could result in service interruptions to customers.	Potentially significant

4.10.1 What are the potential construction impacts on public utilities?

This section describes the potential construction impacts on public utilities within the Plan area during implementation of Management Plan alternatives.

Impacts Common to All Action Alternatives

Construction of the Management Plan alternatives could affect existing above- and below-ground utilities, including electrical power, cable, natural gas, storm and sanitary sewer, water, and others. However, the locations and extent of possible conflicts from specific projects are unknown at this Management Plan stage. During the design and permitting process of individual projects conducted prior to construction of a specific project, the locations and depths of existing utilities would be verified with utility providers. Specific construction methods and BMPs would be developed in consultation with the jurisdictions and the utility providers to provide protection

measures and minimize any temporary utility conflicts. Some sewer diversions may be necessary depending on the scale of construction; this could include rerouting sewage and wastewater to nearby lift stations or surrounding basins. No long-term interruptions to sewer services or other utilities are expected as a result of construction. Therefore, impacts from construction of the Management Plan alternatives on utilities are expected to be **less than significant.**

Pump and Flush Station Improvements

Table 4.10-2 describes the potential impacts on utilities from improvements to lift and pump stations.

TABLE 4.10-2
IMPACTS ON PUBLIC UTILITIES FROM CONSTRUCTION OF IMPROVEMENTS TO PUMP AND FLUSH STATIONS

Improvement Options	Impacts	Significance Determination
1) Replacing or upgrading individual components	No impacts.	Less than significant
2) Significant upgrades. Excluding structure replacement	Likely no impacts, but may require wastewater diversions or coordination with other utilities providers to ensure that no services are interrupted.	Less than significant
3) Replacement of the pump/flush station, including the structure	Could require wastewater diversions to other service areas or lift stations. Could require coordination with other utility providers to ensure no service interruptions occur.	Less than significant

No Action Alternative

Because the No Action Alternative involves sporadic construction, construction-related impacts on public utilities would be similar to those described above and would depend on the presence of utilities in any given location.

4.10.2 What are the potential operational impacts on public utilities?

Common to all Action Alternatives

The Management Plan alternatives would improve the aging sewer infrastructure along the edge of Lake Washington, which would improve the overall function of the system and reduce the risk of potential failures. Currently, several sections of the sewer line have less than one-third of their life remaining and will need to be replaced within the next decade. The rest of the sewer line will need to be replaced by the 2050s. Overall, implementation and operation of the Management Plan alternatives would be a benefit to utility infrastructure in the Plan area, meeting the objectives of the Plan (see Section 1.1).

With these improvements, the risk of a failure of the system (including pipe failure in one or more portions or the alignment) is highly unlikely, but it cannot be eliminated. Impacts from system failure could result in a loss of service for some customers and sewer backups. Although the likelihood of a system failure is low, no mitigation measures could completely eliminate the

possibility of an incident or the resulting impacts. Therefore, the result of system failure is considered a potentially **significant adverse** impact on public utilities.

Pump and Flush Stations

The improvements to pump stations would enhance the function and capacity of the sewer system. This would reduce the risk of failure and future maintenance activities, as well as allow the sewer system to adequately support the growing population of the service area.

No Action Alternative

Under the No Action Alternative, the lake line system would continue to operate under current conditions. Currently, the lake line infrastructure (including the pipeline, pump and flush stations, and maintenance holes) are regularly inspected. However, continued operation of the aging sewer line without the Plan improvements is likely to result in leaks and failure in the future, requiring repairs and replacement. As the pipe continues to age, leaks and system failure become more likely, which could result in service interruptions to existing customers and the need for emergency repairs. Construction activities for repairs and replacement would be similar to construction impacts described under Section 4.10.1 and would require coordination with other utility providers in the Plan area.

Under the No Action Alternative, system failure is more likely as the sewer continues to age; as a result, this is considered a potentially **significant adverse** impact as it could cause sewer overflows and interrupt service to customers.

CHAPTER 5
Mitigation Measures

This chapter describes the potential measures to offset the impacts associated with construction and operation of the LWWLL Management Plan.

The same elements of the environment addressed in Chapters 3 and 4 are described in this chapter, following the same general organization. The potential effects of construction and operation were analyzed for the Plan alternatives and the No Action Alternative.

Under the No Action Alternative, the Plan would not be implemented. The main long-term implications of not implementing the Plan relate to surface water quality and include effects on biological resources, environmental health, and recreation. The only other operational effects would be those caused by the operation and future maintenance and repairs of existing and planned wastewater facilities.

This chapter describes how impacts from construction and operation of the alternatives under the Management Plan could potentially be minimized or mitigated for each environment of the environment. Compliance with regulatory requirements in each jurisdiction would assist with the minimization and mitigation of environmental impacts, as described below.

5.1 Measures to Reduce or Eliminate Potential Impacts on Land Use and Visual Quality

Construction

The following measures could be implemented to reduce or minimize construction impacts on land use and visual quality for all alternatives:

- For construction in shoreline areas, the City of Bellevue Utilities Department would apply for project-specific shoreline permits in the local jurisdictions, when necessary, and would comply with specific permit provisions in effect at the time of permit applications.
- The City would restore disturbed areas after construction in compliance with local jurisdictional requirements, as appropriate.
- The City would provide access to properties and businesses during construction as needed.
- When siting potential new facilities, minimize the potential impacts on private properties by utilizing public rights-of-way to the extent practicable.
- Comply with relevant federal, state, and local property acquisition requirements as appropriate.

Additional mitigation measures for specific land use and visual resource impacts may be identified as appropriate during future review of individual improvements. The City would coordinate with property owners on mitigation efforts as appropriate. The City would comply with all applicable requirements for property acquisition and relocation for residents or workers directly affected during the construction period, if necessary. The City would communicate to area residents prior to the beginning of construction of any improvements, as private construction projects may occur concurrently with Plan implementation projects. Communication of timing may allow residents to plan accordingly for their private projects and alleviate some congestion.

Operation

Operation of the improved system would be similar to existing conditions with respect to land use and visual quality. The City would undertake the following measures to mitigate operational impacts on land use and visual quality for the operation of all proposed improvements:

- Operate facilities to comply with existing land use policies, codes, and regulations. Improved access and ability for maintenance will improve overall system reliability and longevity.

5.2 Measures to Reduce or Eliminate Potential Impacts on Earth Resources

Construction

The following measures could potentially be implemented to reduce or minimize construction-related earth impacts for all alternatives:

- Avoid construction on steep slopes, known and potential landslide zones, and areas with organic or liquefiable soils, where possible, and follow geotechnical recommendations during construction.
- Use appropriate shoring during construction.
- Maintain all sites to minimize erosion.
- Develop and implement a Temporary Erosion and Sediment Control (TESC) Plan.
- Comply with relevant federal, state, and local critical areas and groundwater requirements.
- Dispose of soils at approved disposal sites.
- Dredged materials suspected of contamination and water that comes in contact with the material after dredging would be secured during transport to minimize escapement.

If site-specific earth or groundwater impacts are identified during future review of individual improvements, additional measures to reduce or minimize those impacts would be identified. Clearing and grading permits would be required for all excavation quantities in excess of local jurisdiction limits. **Table 5-1** identifies the current applicable code section per jurisdiction and briefly defines the permit requirement thresholds for earthwork. The individual code sections include additional information on exemptions and requirements, which would be reviewed specifically during the review of individual improvements. Excavated areas would be returned to

existing or improved conditions (e.g., gravel placement, replanting for on land or in-water or repaving for upland) as soon as practical after construction is completed.

TABLE 5-1
JURISDICTION EARTHWORK PERMITS AND REQUIREMENTS

Jurisdiction	Applicable Code Section*	Permit Threshold
City of Bellevue	Chapter 23.76.035 – Permit requirements.	Clearing and grading permit for fill and/or excavation totaling over 50 cubic yards.
Beaux Arts Village	Chapter 15.05.010 (3)(c) – Grading permit.	Grading permit required for any plans to grade, excavate, or conduct earthwork construction.
City of Medina	Chapter 16.43.040 - Grading and drainage permit.	Grading and drainage permit for any excavation, fill, or grading activity involving over 25 cubic yards of earth.
Town of Hunts Point	Chapter 15.45.050 - Permits required.	Site development permit for fill and/or excavation over 50 cubic yards total volume (HPMC 15.45.060).
Town of Yarrow Point	Chapter 20.12.010 - Permit requirements.	Site development permit for all projects involving fill and/or excavation totaling 50 cubic yards or more.
King County	Title 16.82 - Clearing and grading.	Grading permit threshold is 100 cubic yards or creation of 2,000 square feet of new impervious surface.

* Code sections may be updated prior to construction; at the time of construction, the most recent corresponding jurisdiction code sections would be complied with in lieu of the above referenced.

Additionally, if hazardous materials are identified during future analysis and data gathering, additional studies may be necessary to evaluate contamination risk, and to develop site-specific cleanup or pollution prevention plans. For all construction sites, the City would develop plans for sediment and groundwater handling, testing, and disposal, as appropriate. Spill prevention and control plans would be developed as required and to minimize the potential accidental release of contaminants into the environment.

Operation

The City could mitigate operational impacts on earth resources for all proposed improvements under the Management Plan by siting and designing projects to minimize the impacts from seismic risk and earth subsidence on the City's wastewater system. As part of project-specific site analysis and facility design, geotechnical engineering analysis would be conducted to provide data and analysis to inform the design of any new facility to meet jurisdictional seismic design requirements, including the design of shoring, storage structures, pipelines, and related facilities.

5.3 Measures to Reduce or Eliminate Potential Impacts on Air Quality and Odors

Construction

Construction impacts of all the alternatives on air quality and odors would primarily be related to elevated emissions levels from vehicles and other equipment. Construction-related dust and emissions would be minimized by implementation of construction BMPs. The City would comply with applicable regulations for air quality and could use the appropriate mitigation measures listed below. Additional site-specific appropriate mitigation measures may be developed when project locations are determined.

- Use measures to control dust, such as watering construction surfaces, using temporary ground covers, sprinkling the site with approved dust palliatives, or using other temporary stabilization practices upon completion of grading as part of implementation of TESC Plan.
- Encourage the use of well-maintained construction vehicles to reduce vehicle emissions in construction contracts.
- Encourage contractors to offer carpooling options for employees. Local carpools may potentially be required due to limited parking in some areas.
- When possible, use locally sourced building materials to reduce transport distances.
- If removal of asbestos concrete pipes is necessary, appropriate protocol for the removal would be followed.

Measures to minimize air quality impacts may also reduce energy consumption and greenhouse gas emissions. The following measures to mitigate energy and greenhouse gas impacts could be used for all alternatives.

- Incorporate specifications into construction contracts that encourage the use of fuel-efficient construction equipment.
- Minimize engine idling during construction.

Operation

When constructed, most of the infrastructure would be located underground (i.e., pipelines, maintenance holes, vaults) and would not present operational air quality impacts; as such, no mitigation is proposed. The operation of the selected pump stations would not affect the air quality as most of the system would be contained and incorporate measures to minimize emissions of odorous compounds to the atmosphere. The City would implement the following measures to mitigate air quality and odor impacts for the operation of all proposed improvements. Appropriate mitigation measures would be the same for all the alternatives.

- The City would schedule the routine maintenance of the pump and flush stations and wet wells to ensure proper operation.

5.4 Measures to Reduce or Eliminate Potential Impacts on Surface Water Resources

Construction Mitigation for In-Water Alternative

Projects implemented for the In-Water Alternative would be required to comply with all in-water work requirements of the Corps, WDFW, Ecology, WDNR, and local jurisdictions. During construction, standard in-water construction BMPs would be implemented in accordance with environmental permits, plans, and authorizations such as WAC 173-201A, WAC 22-660, and local programs, including the Shoreline Master Program and the Critical Areas Ordinances associated with the various jurisdictions within the Plan area. Specific in-water construction periods would also be confirmed through the project permitting process to minimize potential impacts of in-water construction activities on water quality. Water quality BMPs common to the In-Water Alternative projects may include the following:

- Use cofferdams and/or other appropriate measures to isolate work areas from the open water in Lake Washington and active flows in the surrounding tributaries if dewatering is required.
- Implement temporary erosion and sediment control measures in compliance with regulations to limit sediment inputs to receiving waters during and after construction.
- Use turbidity curtains for in-water work to contain turbid water, as required by permits to confine the impact on the local area and exclude fish from the work area. Turbidity curtain removal would only occur after water quality sampling shows that water quality inside the curtains has returned to allowable limits according to the WAC 173-201A-200(1)(e) Table 200.
- Prepare and implement a Water Quality Monitoring and Protection Plan in compliance with regulatory requirements for in-water activities within the limits of construction, to ensure that state water quality standards are met.
- Implement pollution control measures and waste handling measures to ensure appropriate storage, handling, containment, and use of petroleum products and other potential pollutants on-site during construction. Isolate the work area to prevent spillage of construction materials into the water and have spill response materials on-site during construction
- If open water disposal at Elliott Bay of dredged materials is needed, a Sampling and Analysis Plan would be prepared executed and submitted prior to the disposal. All in-water disposal would comply with the Dredged Material Management Office Requirements (DMMO 2021 in Confluence Environmental Company 2022b).
- Secure dredged materials and water in contact with dredged materials during transport to prevent escapement.
- If contamination above thresholds for cleanup are found in dredged sediments or disturbed soils, take the following actions:
  - Notify the appropriate agencies.
  - Separate hazardous sediments/soils from non-hazardous sediments/soils.
  - Do not dispose of hazardous sediments/soils until a plan for their proper management and disposal is accepted by a designated representative and applicable resource agencies.

- Equipment used for dredging and other in-water work will be decontaminated for invasive species and other contaminants in accordance with regulatory requirements.
- Restore cleared upland areas disturbed from access to in-water work areas and replant with appropriate native herbaceous and woody species to stabilize soils following construction per an approved revegetation plan.

Construction Mitigation for On-Shore and Upland Alternatives

During construction of the On-Shore and Upland Alternatives, impacts on water quality may result from construction runoff or spillage of construction materials. Construction of the Plan projects would comply with the local jurisdictions' clearing and grading code requirements. A Construction Stormwater Pollution Prevention Plan (CSWPPP) is required by Bellevue's clearing and grading code requirements for all projects that meet the threshold of permitting (BCC 23.76.035). The CSWPPP may include a turbidity and pH monitoring plan and be implemented from the time of initial soil disturbance to when project stabilization is complete. A Commercial Clearing and Grading Permit will also likely be required from the local jurisdiction for portions of the project alignment, which may require specific mitigation measures. Additional mitigation measures for the On-Shore and Upland Alternatives may include:

- Stabilize all exposed and unworked soils and stockpile areas to prevent erosion, including seeding, mulching, plastic covering, sodding, and topsoiling.
- Restore cleared upland areas and replant with an approved vegetation plan to stabilize soils following construction. Implement pollution control measures and waste handling measures to ensure appropriate storage, handling, containment, and use of petroleum products and other potential pollutants on-site during construction. Isolate the work area to prevent spillage of construction materials and have spill response materials on-site during construction

Additional measures may be used specific to trenchless methods, which include:

- Establish an effectively contained mud pit outside of sensitive areas to support the drilling activities.
- Use mud pumps and a solids control/drilling fluid filter system to remove excess mud from the borehole.
- Use barriers such as wattles, sandbags, or hay bales placed downslope of the drilling rig, mud pits, and soil separation plant and other equipment to contain potential spills in compliance with jurisdictional requirements.

Operation

Once completed, the Management Plan alternatives are not expected to have any impacts on water resources, so mitigation measures have not been developed.

5.5 Measures to Reduce or Eliminate Potential Impacts on Fish and Aquatic Resources

Construction

Mitigation measures specific to water quality are listed above in Section 5.4. To mitigate impacts on fish, work would only occur during approved in-water work windows. WDFW establishes in-water work windows in Washington per WAC 220-660-110, and the Corps established in-water work windows for Lake Washington and tributaries. The current WDFW and Corps prescribed in-water work windows for the Plan area shown in **Table 5-2**.

TABLE 5-2
PRESCRIBED IN-WATER WORK WINDOW FOR LAKE WASHINGTON AND SURROUNDING TRIBUTARIES

Species	Location	In-Water Work Window	Agency	
			WDFW	Corps
Sockeye Salmon	Lake Washington – within 100 yards of Sockeye Salmon spawning	July 16–September 30	X	
Salmonids	Lake Washington Tributaries	August 1 – August 31	X	
Salmonids	Lake Washington – Between I-90 and SR 520	July 16–April 30		X
Salmonids	Lake Washington – north of 520	July 16–March 15		X
Salmonids	Lake Washington – south of I-90 and within 1 mile of Mercer Slough	July 16–July 31 and November 16–December 31		X
Salmonids	Lake Washington – south of I-90 and farther than 1 mile of Mercer Slough	July 16–December 31		X

SOURCE: Corps (2010) and WDFW (2018) in Confluence Environmental Company (2022b)

Work would occur within the prescribed in-water work windows; additionally, a biologist would be on-site during dewatering to relocate any fish from within the work area.

Following construction, potential mitigation measures may include the following:

- Laying a layer of approved fish mix gravels in areas impacted by open cut construction, which could result in long-term benefits to fish.
- Installation of anchor logs for habitat complexity and bioengineered shoreline stabilization per requirements from the Corps (Corps 2007 in Confluence Environmental Company 2022, and WRIA 8 Salmon Recovery Council 2017 in Confluence Environmental Company2022).
- Restore/enhance disturbed riparian vegetation in on-shore and upland areas by removing invasive vegetative species and revegetating with native species to improve the filtration capacity of wetlands, add shading along the Lake Washington shoreline, and support the development of native plant communities.
- Implement invasive species control including New Zealand mudsnails.

Noise and vibration are not expected to result from in-water construction activities, and therefore would not affect fish and aquatic resources. However, mitigation measures to reduce noise produced from project construction are described in Section 5.7.

Operation

Once completed, projects implemented under the Management Plan alternatives are not expected to have any impacts on fish and aquatic resources, so mitigation measures have not been developed.

5.6 Measures to Reduce or Eliminate Potential Impacts on Plants and Animals

Construction

This section describes the mitigation measures that could reduce impacts on plants and animals from construction of the Plan alternatives. These mitigation measures would be implemented in addition to project design measures, BMPs, and compliance with permits, plans, and authorizations. Construction impacts of all the alternatives on plants, terrestrial wildlife, and habitat would be primarily related to elevated levels of noise and human activity during construction. Measures that minimize the effects of noise and vibration are described in Section 5.7. However, the City may implement the following additional measures to mitigate other potential impacts on plants and animals for all alternatives:

- If sensitive species of wildlife are identified as present and possibly affected by construction, activity at the site will be scheduled to avoid breeding and rearing periods of the sensitive species, as defined by the USFWS or WDFW. This includes avian, aquatic, and mammalian species.
- Follow federal, state, and local permit conditions for managing construction site runoff and protecting habitats.
- Retain site vegetation as much as possible.
- Promptly revegetate disturbed sites with after construction is complete per the permitted planting plans.
- If site alterations occur during the avian breeding season and involve any tree, shrub, or building removal, conduct pre-construction surveys to locate any active nests and fledglings. Any detected nest sites would be buffered and monitored to ensure they are not harmed by project activities.
- Comply with guidelines outlined in the National Bald Eagle Management Guidelines (USFWS 2007).
- Implement invasive species control, including milfoil removal and management, in compliance with jurisdictional requirements.

Operation

Once completed, the projects constructed as part of the Management Plan alternatives are not expected to have any impacts on plants and animals.

5.7 Measures to Reduce or Eliminate Potential Noise Impacts

Construction

When specific project sites are selected, the City would identify potentially impacted receptors and buildings and determine whether noise would exceed permitted levels. If necessary, the City could perform baseline noise surveys at selected locations. If construction activities extended outside the exempt hours established in the applicable local code, the contractors would be instructed to obtain a night work permit or implement measures to reduce noise impacts to comply with the permitted levels in the corresponding code. On-site noise monitoring could be used to ensure compliance with the applicable local code, if necessary.

Construction noise could be minimized by implementation of construction BMPs, including the following:

- Identify potentially impacted receptors and buildings and determine whether noise levels at those sites would exceed permitted levels.
- Encourage noise-reducing measures, such as using sound-control devices on equipment, prohibiting equipment with unmuffled exhaust, minimizing idling time of equipment and vehicles, and installing acoustic barriers around stationary sources of construction noise.
- Conduct on-site noise monitoring to ensure compliance with applicable local code provisions, if required by local agencies.
- Encourage contractors to equip construction equipment engines with adequate mufflers, intake silencers, and engine enclosures to reduce their noise by 5 to 10 dBA, if necessary.
- Contractors would maintain all equipment and train operators of the equipment in good practices to reduce noise levels.
- Temporary diesel generators and temporary pumping equipment operated at night would be required to be fitted with sound attenuation equipment.
- Contractors would adhere to applicable noise regulations or obtain a noise variance from the local jurisdiction.

Operation

A noise analysis for each project would be performed during final design. Once project sites are selected and receiving properties are identified, noise regulations (see Section 3.7.2) can be used to determine the level at which project-generated noise would be considered significant. Project- and location-specific mitigation measures would be determined at that time. Potential mitigation measures could include the following:

- Pump stations could include attenuation measures for fan noise and pump and motor noise to comply with noise levels specified by the jurisdiction and to address location-specific factors as determined during project design.
- Facility vault access hatches would be designed to contain noise within the vault.

- Noise-producing ventilation air intakes and exhausts could be placed in a direction facing away from sensitive receptors whenever possible.

5.8 Measures to Reduce or Eliminate Potential Impacts on Transportation

Construction

Measures to reduce or eliminate potential impacts on transportation networks during construction would be implemented under all alternatives. Site-specific, project-level transportation analysis would be conducted prior to implementation of each project. Since projects may occur in public rights-of-way, which include public streets and property dedicated to use for streets, right-of-way use permit(s) would need to be obtained and requirements in the applicable local code would need to be adhered to as part of the permit conditions. The City of Bellevue requires a right-of-way permit for any disturbance or other private use of the public right-of-way, and potentially a Street Use Permit when temporary parking, shuttle services, and other activities would affect the movement of vehicles or pedestrians (BCC 14.30.080). **Table 5-3** indicates the corresponding jurisdiction code section for work within their respective rights-of-way.

TABLE 5-3
JURISDICTION CODE SECTION FOR WORK WITHIN RIGHT-OF-WAY*

Jurisdiction	Applicable Code Section*
Beaux Arts Village	Chapter 12.15 - Right-of-Way Code
Bellevue	BCC 14.30.080 – Right-of-Way use
Medina	Section 16.70.020. - Right-of-Way Permit; Section 12.06.020. - Right-of-Way Permit Required.
Town of Hunts Point	Chapter 12.05 - Right-of-Way Use Permitting
Town of Yarrow Point	Chapter 12.04 - Street Excavations
King County	Section 14.28 - Rights-of-Way

* Code sections may be updated prior to construction; at the time of construction, the most recent corresponding jurisdiction code sections would be complied with in lieu of the above referenced.

Transportation-related mitigation measures would depend on the type and size of the proposed improvements and could include, but not be limited to, the following:

- If possible, coordinate with other transportation departments to plan for shared construction and to avoid consecutive construction projects (road construction).
- Provide advance notice and coordinate with affected transportation services to minimize disruption of services.
- Maintain access for driveways and private roads to the extent practicable.
- Coordinate with the local neighborhoods and/or residences to ensure that access to residences and businesses is adequately maintained, and that any additional potential issues unique to the neighborhood are identified and addressed.

- Repair or restore the roadway right-of-way to its original condition or better upon completion of the work.
- Develop a Traffic Control Plan for any work within the public right-of-way that affects vehicular, transit, bicycle, or pedestrian traffic in compliance with regulatory requirements. The following measures would be addressed in the Traffic Control Plan and/or approval of the Right of Way Use Permit:
  - Maintain pedestrian and bicycle access and circulation during project construction. If construction encroaches on a sidewalk, a safe detour should be provided for pedestrians at the nearest crosswalk in compliance with regulatory requirements. Adhere to the Americans with Disabilities Act (ADA) accessibility standards for ADA compliance (Department of Justice 2010). If construction encroaches on a bike lane, post warning signs that indicate bicycles and vehicles are sharing the roadway in compliance with regulatory requirements.
  - Provide traffic controls such as flaggers and traffic control officers as appropriate in compliance with regulatory requirements.
  - Maintain access to transit services and coordinate with transit agencies (King County Metro, Sound Transit) if transit stop closures or route detours are needed.
  - Provide traffic detour plans to comply with relevant policies administered by the corresponding jurisdiction transportation department(s), as applicable.
  - Coordinate with the corresponding school district(s) to ensure that access to school buses is maintained.
  - Post standard construction warning signs in advance of the construction area and at any intersection that provides access to the construction area in compliance with regulatory requirements.
  - Provide access for emergency vehicles at all times.

Transportation-related mitigation measures specific to the use of barges for transportation of excavated materials or construction equipment could include the following:

- If required by authorities with jurisdiction and project designs, perform additional evaluations at the project level to determine the feasibility of constructing a dock to support the barge, and to assess agency permit/approval feasibility.
- Coordinate with potentially affected property owners to maintain private water vessel access, where appropriate.
- Follow federal Work in Navigable Waters permit conditions for barge operations that could obstruct or alter navigable waters under Section 10 of the Rivers and Harbors Act of 1899.

Operation

No operational impacts on transportation services are expected; therefore, no mitigation measures are proposed. If potential operational or safety impacts are identified through project-level analysis, mitigation measures would be identified to minimize or avoid those impacts.

5.9 Measures to Reduce or Eliminate Potential Impacts on Cultural Resources

Pre-Construction

A professional archaeologist could be retained to conduct a cultural resources assessment of the potential impacts of the Plan alternatives. This effort would be conducted to meet the regulatory standards of the project for any applicable local, state, or federal cultural resources regulations that apply to the selected design alternative. The effort would minimally include background research, consultation with DAHP and relevant tribes, and identification efforts to document and assess cultural resources, including pedestrian and subsurface archaeological survey. The specific methods should be developed to conduct a complete identification effort in areas identified as having a high potential to contain cultural resources. Depending on the results of the cultural resources survey, additional actions may be required to mitigate impacts on any encountered cultural resources. Additionally, the cultural resources assessment may recommend archaeological monitoring during construction for areas identified as having a high probability for containing cultural resources, or areas where the survey effort was not able to fully evaluate the proposed construction footprint.

Construction

During construction, the City would implement mitigation measures to reduce or eliminate potential impacts on cultural resources from the Management Plan alternatives. These mitigation measures would be implemented in addition to compliance with permits, plans, and authorizations. These mitigation measures may include, but are not limited to:

- Development of an Inadvertent Discovery Plan (IDP) to outline the protocols and follow corresponding procedures in the event that cultural materials are inadvertently discovered during project construction.
- Development of an archaeological monitoring plan (which, depending on individual site conditions, may require on-site observation of excavations by an archaeologist), if required.
- Should a significant discovery be identified, additional coordination with the State Historic Preservation Office (SHPO), and any Affected Tribes may be required.

Operation

Once completed, projects implemented under the Management Plan alternatives are not expected to have any impacts on cultural resources, so mitigation measures have not been developed.

5.10 Measures to Reduce or Eliminate Potential Impacts on Public Utilities

Construction

During construction, the City would implement mitigation measures to reduce or eliminate potential impacts on utilities from the Management Plan alternatives. These mitigation measures could be implemented in addition to project design measures, BMPs, and compliance with

permits, plans, and authorizations. These mitigation measures could include, but are not limited to, the following:

- Utilize temporary pumping to continue the service of the LWWLL to customers if needed.
- If possible, coordinate with other utilities and transportation departments to plan for shared construction and to avoid consecutive construction projects (road construction and other underground utilities).
- Develop construction sequence plans and coordinate schedules to minimize service disruptions and provide ample advance notice if service disruption is unavoidable.
- All construction will acquire a utility locate prior to ground disturbing activities.

Operation

Once completed, the projects constructed under the Management Plan alternatives are not expected to have any impacts on public utilities, so operational mitigation measures have not been developed.

CHAPTER 6
Significant Unavoidable Adverse Impacts

SEPA defines significant impact as "*a reasonable likelihood of more than a moderate adverse impact on environmental quality*" (WAC 197-11-794). This chapter summarizes the potential significant unavoidable adverse impacts associated with the Action Alternatives and the No Action Alternative. Refer to Chapter 4 for further discussion and the impacts analyses for the remaining environmental resources.

6.1 Land and Shoreline Use

Since most of the Lake Washington shoreline is developed for residential use with limited undeveloped land available for improvements, impacts on the adjacent properties and aquatic habitat, during any construction of wastewater system improvements, is likely unavoidable. Implementation of the Plan would involve a wide range of short-term impacts associated with the construction of numerous infrastructure projects. These impacts would mostly occur during construction of underground pipelines and are not expected to cause permanent impacts based on compliance with regulatory requirements.

To the extent possible, the City would avoid private property acquisition and displacement of residents or businesses if property is needed for a new facility (e.g., pump station). Significant unavoidable adverse impacts would occur if acquisition of private property or displacement of residents or businesses were required to implement the Plan.

6.2 Earth Resources

The No Action Alternative could result in significant impacts on the earth and soils of the Plan area in the future, as the system continues to age, should a system failure occur. The frequency, likelihood, and potential impact of failure of the system would also increase as it ages. Undetected leaks over an extended period could contaminate adjacent soils and increase the potential for erosion. A break in the system could cause substantial contamination to earth resources and extensive water release that could move soils in geologically hazardous areas, affecting the surrounding structures, and increasing existing risks in geologic hazardous areas. A wastewater system failure could increase the need for environmental mitigation due the local environment that was impacted (e.g., lake, wetland, stream, or riparian area). In addition, a wastewater system failure could increase the emergency response requirements for repair construction, cleanup, and operations, and lead to more complex upgrades to a failing system in potentially contaminated areas, with increased geologic risk such as erosion or sliding from moved and/or unsettled soils, resulting in potentially significant impacts.

6.3 Surface Water Resources

Although the Action Alternatives would reduce the risk of lake water contamination by updating the aging system, the risk of system failure cannot be completely eliminated by any of the alternatives. If a system failure occurred in or near Lake Washington and its tributaries, it would impact water quality by releasing untreated wastewater, which could degrade water quality and create a public health and safety hazard by releasing bacterial and chemical pollutants. A large system failure would also impact fish health and habitat in the vicinity of the failure. Although unlikely to occur, the risk of system failure cannot be eliminated and is considered a significant impact. The frequency, likelihood, and potential impact of failure is higher with the No Action Alternative than with any of the Action Alternatives due to the age and condition of the existing system.

6.4 Fish and Aquatic Resources

Habitat alterations from emergency repairs, along with turbidity and dissolved oxygen impacts associated with emergency repairs under the No Action Alternative, have the potential to have significant impacts on fish and aquatic resources if unplanned in-water repairs occur outside of the in-water work windows for fish species.

6.5 Public Utilities

Impacts from system failure could result in a loss of service for some customers and sewer backups. Although the likelihood of a system failure is low, no mitigation measures could completely eliminate the possibility of an incident or the resulting impacts. Therefore, the result of system failure is considered a significant adverse impact on public utilities. While this impact is present with all alternatives, the No Action Alternative poses a higher risk of failure than any of the Action Alternatives.

CHAPTER 7
Cumulative Impacts

7.1 What are the past, present, and reasonably foreseeable projects and actions that could affect or be affected by the Lake Line Management Plan?

This cumulative impacts analysis is prepared in accordance with SEPA (Chapter 43.21C RCW), the SEPA Rules (WAC 197-11), and the SEPA Handbook. Cumulative impacts are the effects that may result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). "*Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time*" (40 CFR 1508.7). Generally, an impact can be considered cumulative if: (1) effects of several actions occur in the same locale, (2) effects on a particular resource are similar in nature, and (3) effects are long-term in nature.

Cumulative impacts were analyzed by identifying projects within the same geographic area (Plan area) and within the same potential timeframe of Plan implementation. The published plans described below extend roughly from 2023–2027, while the implementation of the Management Plan would extend much longer (roughly to 2050).

Transportation capital projects and neighborhood projects that may occur concurrently within the Plan area were identified through each jurisdiction's Capital Improvement Plan (CIP) or Capital Investment Program Plans, including the City of Bellevue's 2015 Wastewater System Plan, the City of Bellevue's 2021–2027 Adopted Capital Investment Program Plan, Town of Yarrow Point's 2023–2028 CIP, Town of Hunts Point's 2023–2028 CIP, Beaux Arts Village's 2022–2027 Capital Investment Plan, City of Medina's 2023–2028 CIP, King County's 2023–2028 CIP, and interactive projects mapping, where available. These projects will be constructed regardless of the implementation of the LWWLL Management Plan. Transportation capital projects and neighborhood projects that are in construction or reasonably foreseeable in the Plan area that may contribute to cumulative effects are documented in **Table 7-1**. Due to the potential extended timeframe of Plan implementation, many major ongoing projects in the Plan area are expected to be completed by the time some of the Plan improvements will be built.

Transportation capital projects and neighborhood projects being considered in the Plan area during the same timeframe were identified and analyzed to determine whether cumulative impacts may occur from the combined projects. Other major capital projects were then identified

using plans, agency web sites, and other available information (refer to **Table 7-1**). The potential cumulative impacts of overlapping projects were evaluated from an environmental resource standpoint and between the Action Alternatives and the No Action Alternative.

TABLE 7-1
PUBLIC PROJECTS AND ACTIONS IN THE PLAN AREA

Project or Action	Proponent	Date	Jurisdiction	Service Area
North Mercer Island/ Enatai Sewer Upgrade	King County Wastewater Treatment Division	2022–2025	Bellevue, King County	Killarney – intersects Plan area
Water Main Replacement 2023 - Phase 1	Bellevue Utilities	2022–2025	Yarrow Point	Hunts Point and Yarrow Point - within/intersects Plan area
98th Avenue SE (97th Place SE) and SE 11th Street Slope Stabilization	Bellevue	2023–2024	Bellevue	Killarney - within 0.1-mile from Plan area
AC Water Main Replacement 2021 - Phase 3	Bellevue Utilities	2021–2023	Medina, Bellevue	Hunts Point and Yarrow Point - 0.1-mile from Plan area
Water Main Replacement 2022 (ongoing – future sites to be selected)	Bellevue Utilities	2022–2024	Bellevue	Meydenbauer Bay, Medina South – within Plan area
East Link Light Rail Construction	Sound Transit	2016–2023	Bellevue	Killarney - intersects Plan area
S Ridge Pump Station & Force Main	Bellevue Utilities	2022–2024	Bellevue, King County	Newport South – within Plan area
SE 29th Water Supply Line	Beaux Arts Village	2025 (Planned Year)	Beaux Arts Village	Killarney – within Plan area
S-16 Sewer Pump Station Improvements – Cozy Cove, Hunts Point, Evergreen East and West, and Fairweather Pump Stations	Bellevue	2019–2025	Yarrow Point, Hunts Point, Medina, Bellevue	Hunts Point and Yarrow Point, Evergreen Point - within/adjacent to Plan area
Bellevue Comprehensive Plan 2024 Update	Bellevue Community Development	2024-2044	Bellevue	Bellevue and areas east of Plan area

7.2 What are the potential cumulative impacts of the Lake Line Management Plan?

Plan elements could be constructed in areas that may have recently been subject to other construction projects or will be subject to construction of future planned projects. The cumulative impacts associated with the Management Plan relate largely to construction of the improvements under the Action Alternatives. The Management Plan will potentially result in cumulative impacts associated with extended construction impacts from improvements that would require long-term construction and may overlap with other construction activities in the Plan area. In addition, the scheduling of lake line improvements in a consecutive manner could lead to cumulative impacts of extended construction impacts. Long-term construction could contribute to

surface water impacts from ongoing runoff based on the location of the existing infrastructure. Ongoing BMPs to control runoff and continued construction monitoring would be implemented. The long-term effects of dealing with construction-related impacts can negatively affect residents, businesses, and those who access or travel to and through the area, resulting in impacts that range from temporary inconvenience to construction fatigue on residents, businesses, and recreational activities. Other major construction projects could contribute to cumulative impacts on transportation or air quality even if located farther away from the Action Alternative improvements.

Many neighborhoods, residents, and workers may experience ongoing construction noise and traffic delays for years from unrelated construction efforts. “Construction fatigue” could be worse in neighborhoods that have seen a high level of construction for other projects in recent years or that would experience extended construction times. Impacts from construction could be offset by deferring construction in neighborhoods or areas where construction has occurred under other Plan improvements.

To the greatest extent practicable, the City would try to time construction projects to minimize neighborhood impacts and reduce overall construction-related impacts in affected communities. The City will coordinate closely with the proponents of major projects to minimize the potential for cumulative impacts; however, some level of cumulative impact is unavoidable. As appropriate, the City will develop site- specific mitigation during the review period for each individual improvement.

Implementation of the Management Plan is expected to result in long-term benefits to the environment and customers by providing a more reliable level of service and extending the life of the lake line system while minimizing risk to the environment. After construction, the lake line system would be less likely to fail and would be maintained more efficiently, resulting in a lower risk of environmental contamination from system failures. In addition to protecting water quality in Lake Washington, this would reduce the potential for human health risks associated with potential system failure and provide benefits to existing customers. Cumulative impacts are not expected from the No Action Alternative; however, the No Action Alternative has the highest probability of minor or major system failure out of all the alternatives, which would threaten environmental conditions.

7.3 Comparison of Cumulative Impacts among the Plan Alternatives

All of the improvements under the Action Alternatives could include construction projects that overlap with other unrelated construction projects throughout the Plan area. While cumulative impacts are generally similar between the Action Alternatives, the following differences exist.

The primary construction impacts related to improvements from the Action Alternatives would include traffic and slowdowns, increased dust and emissions, and construction noise. The On-Shore and Upland Alternatives would have the potential to cause cumulative impacts on transportation, noise, and air quality to a greater extent than the In-Water Alternative by occurring

on-shore and upland adjacent to the other unrelated construction projects, which also impact those resources in the same timeframe. Improvements under the In-Water Alternative could contribute to cumulative water quality impacts if additional in-water projects occur during the same timeframe that also potentially increase the risk of spills and turbidity and decreasing dissolved oxygen levels in the surface water.

The Action Alternative improvements would have long-term benefits to the environment and customers by providing a more reliable level of service and extend the life of the lake line system while minimizing risk to the environment. After construction of the Action Alternative improvements, the lake line system would be less likely to fail and be maintained with fewer challenges. This would reduce the potential for risks to human health and the environment associated with potential system failure and provide benefits to existing customers. Cumulative impacts are not expected from the No Action Alternative; however, the No Action Alternative has the highest probability of minor or major system failure of all the alternatives, which would threaten water quality, aquatic life, and human health. If emergency repairs are necessary, the cumulative effects could be extensive to adjacent properties and the surrounding habitats. Overall, the Action Alternatives would result in greater long-term benefits to the reliability of the wastewater system, and the accompanying reduction of potential risk to human and environmental health than the No Action Alternative.

CHAPTER 8
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Appendix A
SEPA Scoping Report

ESA

LAKE WASHINGTON WASTEWATER LAKE LINE MANAGEMENT PLAN

SEPA Scoping Summary

Prepared for
City of Bellevue

December 2022

ESA

1 INTRODUCTION AND PROJECT OVERVIEW

This document summarizes public comments received by the City of Bellevue during the State Environmental Policy Act (SEPA) Programmatic Environmental Impact Statement (EIS) scoping period for the Lake Washington Wastewater Lake Line Management Plan (the Plan) between July 11 and August 5, 2022.

The report contains an overview of the SEPA scoping process and Lake Washington Wastewater Lake Line EIS, a discussion of EIS public engagement efforts, and a summary of comments provided during the scoping comment period. Appendix A presents a copy of the Determination of Significance and Request for Comments on the Scope of the Programmatic EIS, Appendix B contains all comments received during the scoping period, and Appendix C includes all questions asked during the virtual public scoping meeting Q&A session.

1.1 SEPA SCOPING PROCESS

The purpose of scoping is to establish and confirm the focus of the EIS by seeking input from agencies, tribal governments, and members of the public on the content and emphasis—or scope—of the EIS. Scoping also provides notice to the public and other agencies that an EIS is being prepared, and typically initiates their involvement in the EIS process.

An EIS is a document that provides impartial, comprehensive discussion of a project's potential significant adverse impacts, reasonable alternatives, and proposed measures to avoid or minimize impacts. A programmatic, or non-project EIS provides decision-makers with information to consider in making decisions, policy changes, and approval decisions. A programmatic EIS evaluates the effects of a proposal with a broad reach such as a program, plan, or policy, and may include a wide range of individual projects, a long-term implementation timeframe, or span a wide geography. It does not constitute a decision or approval on its own. An EIS is not a cost-benefit analysis for a plan or project; rather, an EIS provides environmental information to be considered alongside economic and other policy considerations in reviewing actions that could significantly affect the environment.

Scoping under SEPA began in July 2022 when the City of Bellevue issued a Determination of Significance (DS)/Scoping Notice for the Lake Washington Wastewater Lake Line Management Plan. The DS was issued because the City of Bellevue, as the lead agency, determined the Plan is to likely have significant adverse environmental impacts, and has initiated the EIS process. The scoping notice included a summary of the proposed actions for the Lake Washington Wastewater Lake Line Management Plan, as well as ways to provide comments. Information obtained from the public comments will be used to help the City of Bellevue in framing the scope of the environmental review and in choosing the elements of the environment and alternatives to be evaluated in the programmatic SEPA EIS.

1.2 LAKE WASHINGTON WASTEWATER LAKE LINE MANAGEMENT PLAN EIS OVERVIEW

The City of Bellevue's "Lake Lines" are a portion of the wastewater system located along the shorelines of Lake Washington as well as some in Lake Sammamish. Approximately 14.6 miles of the lake lines run along the Lake Washington shoreline, connected to 15 pump stations and eight flush stations. These sewer pipes are either underwater or on land adjacent to the lake.

Most of the Lake Washington lake lines were constructed in the 1950s and '60s to prevent raw sewage from being discharged into the lake. Half a century later, the line now serves more than 1,000 community members in Bellevue and neighboring communities. However, the pipes that constitute the line are aging, and their location creates challenges for repair and replacement.

Without advance planning for necessary repairs and replacement, the lake line will begin to fail, potentially causing loss of service to residents and risk to the sensitive lake environment. Bellevue Utilities is developing a management plan for the repair, replacement and maintenance of the aging pipes that constitute its Lake Washington wastewater lake line. The management plan will help to provide reliable wastewater service and protect the Lake Washington ecosystem for generations to come.

While Bellevue Utilities is working on the lake line management plan, it is simultaneously preparing an EIS. An EIS is prepared when the lead SEPA agency determines a proposal is likely to have significant adverse environmental impacts. This is a programmatic (non-project) EIS because the management plan is not a specific project, but rather a series of potential solutions, options, or recommendations on potential future projects which will need to be implemented for the lake line. The EIS will provide decision-makers and the public with a complete and impartial analysis of the potential environmental impacts associated with implementation of the proposed management plan. Any future proposed projects may need project-specific SEPA review, project permitting (local, state, federal), and additional public outreach and engagement.

1.3 ALTERNATIVES

The lake line presents multiple technical, environmental, operational and financial challenges because of its location in and adjacent to the lake. Maintaining or replacing the line could have impacts on the environment, as well as property owners and the public. The management plan will help the City identify potential solutions and their impacts. Potential solutions could take place in the lake, on land and on individual properties. It is important to note that different areas of the system will have different selected alternatives. There will not be one alternative selected for the entire lake line system.

No Action Alternative

- No capital improvements (system components will eventually fail, but extending the life where feasible and conducting emergency repairs, cleaning, condition assessments).
- Continued operations and maintenance of pump, lift and flush stations and associated system infrastructure.
- The system will remain in the existing location.
- **Methods include:** Administrative/code enforcement actions, cleaning and inspection, access improvements (manhole, cleanout installation), data collection, emergency repairs.

Alternative 1 - In water - Any permanent system improvements to infrastructure would be generally located below the ordinary high water of Lake Washington.

- **Possible methods include:** gravity sewer line via open cut construction, gravity sewer line via trenchless, trenchless rehabilitation (cured-in-place pipe (CIPP), SPR (Spiral wound pipe), sliplining, pipe bursting, emerging technologies), new or retrofitted pump/lift/flush and associated improvements.

Alternative 2 - On shore - Conveyance system infrastructure would be generally located between the residence and the ordinary high water of Lake Washington.

- **Possible methods include:** gravity sewer line via open cut construction, gravity sewer line via trenchless, vacuum sewer system, new or retrofitted pump/lift/flush and associated improvements.

Alternative 3- Upland - Conveyance system infrastructure would be generally located upland of the residence and within the general vicinity of the public right-of-way.

- **Possible methods include:** gravity sewer line via open cut construction or trenchless, grinder pump system, vacuum sewer system, new or retrofitted pump/lift/flush and associated improvements.

2 PUBLIC ENGAGEMENT

The City of Bellevue is committed to sharing information and gathering feedback from community members. The City followed the legal notification requirements and conducted outreach activities as described below to notify agencies, tribal governments, members of the public and stakeholders of the scoping comment period and virtual public scoping meeting. Following the conclusion of scoping, City staff remain available to answer questions via email and telephone during regular business hours.

2.1 SCOPING NOTIFICATIONS

The City notified the public of the SEPA scoping comment period through the following methods:

- Posters were distributed to 12 strategic communal locations within the project area.
- The City mailed 6,342 postcards to residents living within the project area.
- The City included an article in the billing stuffer that is mailed out to all Bellevue Utilities customers with their bill.
- An article about the project and promoting how to give feedback on the management plan as well as how to provide an official EIS scoping comment was included in the City's quarterly newsletter It's Your City was distributed to all City of Bellevue residents.
- Social media post on Twitter and Facebook were published to the City's main account, and those post shared links directing viewers to the online open house.

2.2 SEPA SCOPING OUTREACH ACTIVITIES

The following are summaries of outreach tools the City used to promote the project and SEPA scoping comment period.

2.2.1 Online Open House

To share information about EIS scoping and accept scoping comments for the management plan EIS, Bellevue Utilities hosted an online open house on the EngagingBellevue.com platform. The online open house was live from Monday, July 11, to Wednesday, August 31, extending longer than the scoping period. The online open house shared information about the Lake Washington Lake line system, why a management plan and EIS are needed, and potential alternatives for the aging lake lines. Information and graphics for three potential alternatives – an in-water, on shore, and upland – were presented. The

online open house was published in English and a summarizing text block of information was provided on the website in Chinese (simplified and traditional), Japanese, Korean, Spanish, and Vietnamese. Visitors were able to submit scoping comments through an online open house form available in all seven languages. The online open house had a total of 286 visitors during the scoping period and two English EIS scoping comments were submitted.

2.2.2 Virtual public meeting

The City of Bellevue also held a virtual EIS scoping meeting for the project. This meeting was a Zoom webinar held on Tuesday, July 26, 2022, from 6 to 7:30 p.m. There was a total of 12 attendees. The meeting was recorded and posted on the City website for community members to view. The EIS meeting was formatted into two sections: the first section was a presentation by the project team. They presented the same information shared in the online open house website. After the presentation portion, the meeting moved to an open forum for attendees to submit their scoping comments through the Q&A tool on Zoom. Attendees were asked to submit EIS comments or questions directly related to the EIS process to be answered live; any other questions, including those related to the management plan, were answered offline by a project team member. Ten comments/questions were received during the comment section of the meeting; four questions were answered during the EIS scoping meeting, four questions were responded to offline, and two comments on the presentation were made.

3 SUMMARY OF SCOPING COMMENTS

This section provides a high-level summary of comments received during the SEPA scoping process. The comments are organized by topic according to general themes. Comments have been summarized, paraphrased, and are grouped generally for review purposes.

A total of 6 different comments were received during the scoping period: 2 comments were submitted via the Engaging Bellevue comment portal, and 4 comments were submitted via email. The 6 direct comments included one that was submitted on behalf of the Department of Ecology, one submitted on behalf of the Snoqualmie Indian Tribe, and the remaining four comments were submitted by individuals.

Appendix B contains the individual comment submittals including a list of the individuals from whom they were received.

At the virtual public scoping meeting, 10 questions were asked on topics including the logistics of the meeting, as well as questions specifically about the wastewater lake lines that project staff followed up on via email following the meeting. Appendix C contains the questions submitted about the EIS process and meeting logistics. These are general questions and not considered official scoping comments, but have been included for reference.

Official scoping comment themes included:

- One comment requested that any proposed management plan should evaluate and address potential impacts on juvenile chinook salmon habitat in Lake Washington.
- One comment noted that any potential impacts to waters of the state, including Lake Washington as well as wetlands and streams, creeks, and ditches in the upland areas of the project, should be addressed; in-water work related to mitigation activities also should be considered; and, depending on the impacts proposed as a result of this work, a Section 401

Water Quality Certification and Coastal Zone Management Consistency decision may be required.

- Another comment noted concern about an earthquake causing sewage to spill into Lake Washington.
- One comment requested the analysis include impacts to residents.
- Another comment requested that areas of the wastewater lake line that show most concern should be addressed first, and noted it was challenging to comment on what to study in the EIS without knowing what the EIS encompasses.
- One comment noted a high likelihood of encountering archaeological deposits along Lake Washington. The comment elaborated that to maintain water quality and reduce long-term risk to environmental resources and human health, the City of Bellevue should strive to decommission sewer lines in Lake Washington, moving lines to less risky areas, and ensure that public and private side sewers are well maintained.

4 Next Steps

The City of Bellevue project team has reviewed all scoping comments received and will use them, as appropriate, to focus the environmental analysis included in the Draft EIS. This will include identifying specific environmental analyses for the elements of the environment and the range of alternatives to be analyzed in the Draft EIS. Scoping comments will not be addressed individually with a specific response; however, the concerns and topics identified will be addressed in the body of the EIS.

It is anticipated that the Draft EIS is scheduled to be published in the spring of 2023, at which point it will be available for public review and comment. Following publication of the Draft EIS, agencies, affected tribes, and the public will have an opportunity to comment on the content of the document. The City of Bellevue will host an extensive public notification process to solicit comments on the Draft EIS.

Notice of the public comment period will be posted in The Seattle Times and on the Washington State Department of Ecology's SEPA Register, and will be sent directly to all parties who submitted scoping comments, affected tribes, agencies with jurisdiction, and those who have specifically asked to receive notices about the project. Notice will also be posted on the project website at https://bellevuewa.gov/city-government/departments/utilities/utilities-projects-plans-standards/capital-projects/lake-washington-line.

After the Draft EIS comment period, the City of Bellevue will prepare the Final EIS.

APPENDIX A: DETERMINATION OF SIGNIFICANCE AND REQUEST FOR COMMENTS ON THE SCOPE OF THE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENTS

NOTICE OF DETERMINATION OF SIGNIFICANCE (DS)

NOTICE OF ENVIRONMENTAL IMPACT STATEMENT SCOPING PERIOD

NOTICE OF PUBLIC SCOPING MEETING

Project Name: Lake Washington Wastewater Lake Line Management Plan (LWWLL)

Project Proponent: City of Bellevue Utilities Department

Location: Lake Washington shoreline within the cities of Bellevue, Beaux Arts, Medina, Hunts Point, Yarrow Point, and unincorporated King County.

File Number: 22-112187-LE

Description: Bellevue Utilities is developing a management plan to identify long-term operational and capital improvement strategies for the future repair, replacement and maintenance of the existing sewer line located underwater or on land adjacent to Lake Washington.

The Lake Washington lake line system includes 14.6 miles of sewer lines, as well as 15 pump/lift stations and 8 flush stations.

A complete project description and background is available on the project website for the Lake Washington Wastewater Lake Line Management Plan.

Determination of Significance (DS): The Environmental Coordinator of the City of Bellevue, serving as lead agency, has determined that this proposal could have a significant adverse impact upon the environment. An Environmental Impact Statement (EIS) is required under RCW 43.21C.

Programmatic EIS: A "programmatic" EIS will be prepared to inform the Lake Washington Wastewater Lake Line Management Plan (LWWLL). No construction is currently planned or proposed. Future repair, replacement or maintenance activities of the wastewater lake line and associated facilities will require separate project-level environmental review.

EIS Alternatives: Note that different areas of the system may have different selected alternatives - there may not be one alternative selected for the entire Lake Washington Wastewater Lake Line system. Implementation will occur over different time horizons.

No Action - No capital improvements (system components will eventually fail, but extending the life where feasible and conducting emergency repairs, cleaning, condition assessments). Continued operations and maintenance of pump, lift and flush stations and associated system infrastructure. The system will remain in the existing location.

Implementation methods may include: Administrative/code enforcement actions, cleaning and inspection, access improvements (manhole, cleanout installation), data collection, emergency repairs.

Alternative 1 - In water - Any permanent system improvements to infrastructure would be generally located below the ordinary high water of Lake Washington. Depending upon system components and conditions, system infrastructure would be relocated or replaced in water.

Implementation methods may include: gravity sewer line via open cut construction, gravity sewer line via trenchless, trenchless rehabilitation (cured-in-place pipe (CIPP), SPR (Spiral wound pipe), sliplining, pipe bursting, emerging technologies), new or retrofitted pump/lift/flush stations and associated improvements.

Alternative 2 - On shore - Any permanent system improvements to infrastructure would be generally located between the residence and the ordinary high water of Lake Washington. Depending upon system components and conditions, system infrastructure would be relocated or replaced onshore.

Implementation methods may include: gravity sewer line via open cut construction, gravity sewer line via trenchless, vacuum sewer system, new or retrofitted pump/lift/flush and associated improvements.

Alternative 3- Upland - Any permanent system improvements to infrastructure would be generally located upland of the residence and within the general vicinity of the public right-of-way. Depending upon system components and conditions, system infrastructure would be relocated or replaced upland.

Implementation methods may include: gravity sewer line via open cut construction or trenchless, grinder pump system, vacuum sewer system, new or retrofitted pump/lift/flush and associated improvements.

List of Elements of the Environment: The lead agency has preliminarily identified the following elements of the environment for discussion in the EIS:

Surface Water Resources
Aquatic Resources
Terrestrial and Riparian Resources
Geology
Noise
Air Quality
Environmental Health
Land Use
Transportation
Cultural Resources
Utilities

EIS Scoping and Public Comment: Agencies, affected tribes, and members of the public are invited to comment on the scope of the EIS.

Scoping comments should focus on EIS alternatives, EIS elements, probable significant adverse impacts, and mitigation measures.

Please note there will be separate opportunities to comment on the Lake Washington Wastewater Lake Line Management Plan (LWWLL).

The EIS public scoping comment period opens July 7, 2022. The deadline for submitting scoping comments is 5:00 PM August 4, 2022. All comments related to project scoping must be submitted by this date. Comments may be submitted in writing or orally at the scoping meeting. A valid physical mailing address is required to establish status as an official party of record.

EIS Comments may be submitted by:

Email: LakeLineEIS@Bellevuewa.gov

Mail: City of Bellevue Development Services Department
Attn: Reilly Pittman
450 110th Avenue NE
Bellevue, WA 98004

Orally at the Scoping Meeting: An on-line public scoping meeting will be held on the Zoom platform on July 26, 2022 from 6-7 PM. Register for the meeting at this link: https://us02web.zoom.us/webinar/register/WN_RG7w8GPcSOuP_KYtyiJr4Q.

Online: An online open house will launch Monday, July 11, 2022 with more information about the EIS process, scoping, and an online comment portal. Please visit https://www.engagingbellevue.com/lake-washington-line on July 11 to learn more.

Contact Information:

Lake Washington Wastewater Lake Line Management Plan
Contact: Angela Chung, COB Utilities Department, achung@bellevuewa.gov

SEPA Lead Agency Contact:
Reilly Pittman, Environmental Planning Manager, rpittman@bellevuewa.gov
Elizabeth Stead, Land Use Director and SEPA Responsible Official, estead@bellevuewa.gov

APPENDIX B: SCOPING COMMENTS

Scoping Comments

#	First Name	Last Name	Contact/Affiliation	Comment	Comment Method
1	Anita		askoog@outlook.com	Entire Bellevue-managed sewer line should be inspected and areas that show concern should be addressed first. FYI – Its odd to ask the public what they would study without defining what an EIS is supposed to encompass.	Engaging Bellevue comment form
2	Modlee		sarahmlee1@mac.com	How it impacts residents	Engaging Bellevue comment form
3	Bruce	Hand	bruceghand@gmail.com	In a major earthquake predicted for this area Lake Washington will be the only water source for many. Unfortunately, the shoreline sewer system as well as other sewer systems make Lake Washington the default sewer in such an earthquake.. The solution to the shoreline sewer problem should be done in a way that the replacement as well as other existing sewer systems in general will not spill sewage into Lake Washington in the event of a major earthquake. This is a difficult goal to meet. Bruce Hand 425-533-8234	Email
4	Kelli	Sheldon	kelli.sheldon@ecy.wa.gov Department of Ecology	Dear Reilly Pittman: Thank you for the opportunity to provide comments on the State Environmental Policy Act (SEPA) determination of significance draft environmental impact statement (EIS) scoping period (DS/SCOPING) for the Lake Washington Wastewater Lake Line Management Plan. The Department of Ecology (Ecology)	Email

				would like to offer the following comments for your consideration: Section 401 Water Quality Certification and Coastal Zone Management Consistency Any potential impacts to waters of the state should be addressed in this section, including Lake Washington as well as wetlands and streams, creeks, and ditches in the upland areas of the project. In-water work related to mitigation activities also should be considered. Depending on the impacts proposed as a result of this work, a Section 401 Water Quality Certification and Coastal Zone Management Consistency decision may be required. Thank you for considering these comments from Ecology. If you have any questions or would like to respond to these comments, please contact Rebekah Padgett from the Shorelands and Environmental Assistance Program at (425) 365-6571 or by email at Rebekah.Padgett@ecy.wa.gov@ecy.wa.gov. Sincerely, Kelli Sheldon SEPA Coordinator	
5	Matthew	Baerwalde	Mattb@snoqualmietribe.us Snoqualmie Indian Tribe Environmental & Natural Resources Dept.	To Whom It May Concern, The Snoqualmie Indian Tribe—sdukʷalbixʷ in our Native language—is a federally recognized tribe in the Puget Sound region of Washington State. Known as the People of the Moon, Snoqualmie tribal members were signatories to the Treaty of Point Elliott in 1855 and have inhabited the shores of the Snoqualmie and Snohomish	Email

				Rivers, Lake Washington and sqaʷx̌ x̌aču (Lake Sammamish) for thousands of years. The rivers and lakes, floodplains, and the surrounding areas continue to be a core location for the Tribe's traditional and cultural activities. As the City of Bellevue scopes an updated management plan for its Lake Washington sewer lines, it should always be cognizant of the high likelihood of encountering archaeological deposits, known or unknown, along Lake Washington in particular or any waterbody. To maintain water quality and reduce long-term risk to environmental resources and human health, the City of Bellevue should strive to decommission sewer lines in Lake Washington, moving lines to less risky areas, and ensure that public and private side sewers are well maintained. Thank you for the opportunity to comment. Sincerely, Matt	
6	Jim	Loring		Thank you for this opportunity for formal comment on the City of Bellevue's Lake Washington Lake Line Management Plan EIS. Any proposed management plan alternatives should take into account the habitat use of juvenile Chinook salmon in Lake Washington and address any and all potential adverse impacts. I would like to direct your attention to two resources to take into consideration -	

				1. Slides from a presentation by Roger Tabor of USF&W titled 'Habitat Use Juvenile Chinook Salmon in Lake Washington and the Ship Canal' given in 2010 at (https://tinyurl.com/4c7se9v8). Of particular interest is any activity taking place in the Littoral Zone and time of year juvenile Chinook may be present. 2. “Habitat Use by Juvenile Chinook Salmon in the Nearshore Areas of Lake Washington: Effects of Depth, Lakeshore Development, Substrate, and Vegetation" at (https://tinyurl.com/3mxwwezj) I am a Bellevue resident and volunteer with the Friends of the Issaquah Salmon Hatchery (FISH) and have worked with the author of the these two resources, Dr. Roger Tabor, in salmon recovery efforts. Once again, please be mindful of any potential adverse impacts in developing the Bellevue Lake Line Management Plan. Regards, Jim Loring 1815 153rdAYe. S.E. Bellevue, WA 98007-6141	

APPENDIX C: QUESTIONS SUBMITTED DURING VIRTUAL PUBLIC SCOPING MEETING Q&A

The following questions were submitted using the Zoom Q&A feature during the virtual EIS scoping meeting held on Tuesday, July 26, 2022, from 6 to 7:30 p.m.

#	Question	Asker Name	Asker Email	Answer
1	will this be available for viewing later?	Betsi Hummer	betsihummer@yahoo.com	Yes a recording of this meeting will be available in a few days on our project website and online open house
2	how are current repair and maintenance costs covered? how much responsibility does the City have for private homes and businesses?	Betsi Hummer	betsihummer@yahoo.com	Answering individually via email
3	how does this compare or contrast to bringing in the sewer line at Meydenbauer Bay Park? does the sewer line continue around Meydenbauer bay itself?	Betsi Hummer	betsihummer@yahoo.com	Answering individually via email
4	good	Betsi Hummer	betsihummer@yahoo.com	
5	I appreciate Riley saying environmental impact statement instead of always saying eis	Betsi Hummer	betsihummer@yahoo.com	

6	how can we see all the comments and questions?	Betsi Hummer	betsihummer@yahoo.com	Right now, we're collecting all the comments and questions, those will be recorded. If you would like to see those, they can be requested through a public records request. They'll be part of the project record and the file as we go forward. So if you want to see what anyone else is commenting on or any of the questions that are being asked, that would be the best way to do it once we have collected all of those and put them in the record.
7	am I the only participant with questions? how many participants attended?	Betsi Hummer	betsihummer@yahoo.com	You're not the only participant. We have about 10 folks on the line.
8	The project seems to end at Newcastle Way at the southern end. How is the lake line connected in to the flow to the sewage processing station (Renton?) Is that the point at which the lake line moves on land?	Jonathan Burbaum	burbaum@gmail.com	Answering individually via email

9	Specifically, I believe that there is a sewer line along Seahawks Way (near VMAC) that is onshore, so is there already a pump/grinder at that point already?	Jonathan Burbaum	burbaum@gmail.com	Answering individually via email
10	how can I see all the other questions?	Betsi Hummer	betsihummer@yahoo.com	Right now, we're collecting all the comments and questions, those will be recorded. If you would like to see those, they can be requested through a public records request. They'll be part of the project record and the file as we go forward. So if you want to see what anyone else is commenting on or any of the questions that are being asked, that would be the best way to do it once we have collected all of those and put them in the record.

Appendix B

Construction Approaches and Methods

ESA

APPENDIX B
Construction Approaches and Methods

The following construction methods would be analyzed for feasibility and applicability under each Management Plan Action Alternative, in combination with an evaluation of other factors (as described in Chapter 2 Section 2.8), to determine the best strategy or strategies to implement for each Service Area. For the purposes of the impacts analyses (Chapter 4), the construction approaches (i.e. gravity sewer line, vacuum sewer, pipe bursting) were categorized as either open cut construction methods or trenchless construction methods to evaluate the potential impacts on a programmatic level for each potential Action Alternative (see **Table B-1**). The alternative and construction methods selection process will consider and weigh the impacts analysis, evaluation factors and location constraints to determine the best construction method at any given location. More details on the evaluation factors, such as environmental, regulatory, social, technical, and cost, are included in Chapter 2 Section 2.8.

TABLE B-1
ACTION ALTERNATIVES AND CONSTRUCTION APPROACHES AND METHODS

Alternative	Construction Method	Construction Approach
In-Water	Open Cut	Gravity Sewer Line via Open Cut Construction
	Trenchless	Gravity Sewer Line via Trenchless Technology
	Trenchless	Cured in-place pipe (CIP)
	Trenchless	Spiral Wound Pipe (SPR)
	Trenchless	Slip Lining
	Trenchless	Pipe Bursting
	Trenchless	Emerging Technologies
On-Shore	Open Cut	Gravity Sewer Line via Open Cut Construction
	Open Cut	Vacuum Sewers
	Trenchless	Gravity Sewer Line via Trenchless Technology
Upland	Open Cut / Trenchless	Gravity Sewer Line via Open Cut Construction
	Trenchless	Gravity Sewer Line via Trenchless Technology
	Open Cut / Trenchless	Grinder Pumps
	Open Cut	Vacuum Sewers

In-Water Alternative

Gravity Sewer Line via Open Cut Construction

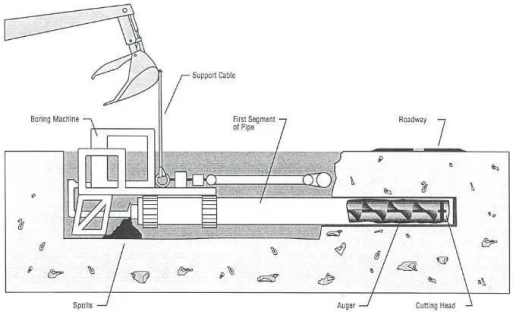
This approach constructs a new pipeline within the lake using open cut methods. This could include installation of a new pipe within the current alignment, or more likely a new alignment with more consistent slope and improved access for maintenance. Extensive dewatering of the in-water work zone would be necessary to facilitate open cut construction.

Gravity Sewer Line via Open Cut Construction

Gravity Sewer Line via Trenchless Technology

This approach constructs a new pipeline within a new alignment within the lake using trenchless methods, likely to be an auger bore given site constraints and the need to maintain a tight grade tolerance to accommodate a shallow gravity sewer system.

Gravity Sewer Line via Trenchless Technology



The Constructor – Trenchless Construction Methods and Their Details and Uses, n.d.

Cured in-Place Pipe (CIPP)

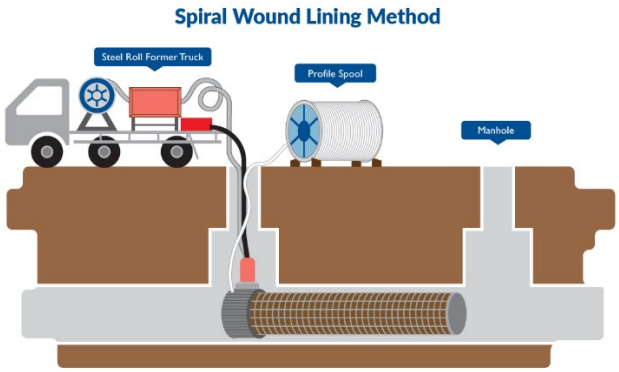
This trenchless construction approach rehabilitates the existing lake line sewer pipeline using a CIPP liner. This would require maintaining the alignment and elevation of the existing pipe. The reduction in capacity due to the liner thickness is typically offset by the improvement in the smoothness of the installed pipe liner.

Cured-in-Place Pipe (CIPP)

Spiral-Wound Pipe (SPR)

This trenchless construction approach rehabilitates the existing lake line sewer pipeline using a spiral wound pipe repair. This would require maintaining the alignment and elevation of the existing pipe.

Spiral Wound Pipe (SPR)

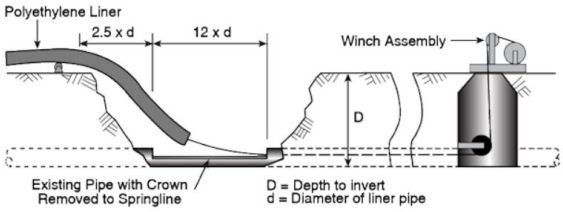


PUB: Singapore's National Water Agency – Sewer Rehabilitation, n.d.

Slip Lining

This trenchless rehabilitation approach involves insertion of a new plastic pipe through the existing lake line host pipe. This would require maintaining the current pipeline alignment and elevations of the existing pipe and would reduce the diameter of the lake line.

Slip Lining



Typical Slip Lining Access Pit and Setup for Pulling Prefused Lengths of Polyethylene Liner

(Plastic Pipe Institute - Slip Lining Construction Guidelines, n.d.)

Pipe Bursting

This trenchless construction approach is a trenchless method of replacing the existing pipe by pulling a new pipe through the existing pipe while bursting the host pipe so that existing diameters can be maintained or increased in the new pipeline.

Pipe Bursting

Emerging Technologies

Emerging trenchless construction technologies such as the following could be considered; however, they have a limited history of implementation and may not be proven for use in lake line systems given the unique challenges of the site conditions.

- **Fiber-reinforced Flexible Hose:** Involves insertion of a semi structural collapsible hose through the host pipe.
- **Platelet Technologies**: Provides leak mitigation and repair within the existing lake line by using flow and pressure differential to deliver specially designed platelet sealant elements to the leak sites.
- **Spray Applied Polymer:** Rehabilitation technique to plug minor leaks within the host pipe. Requires minimal excavation but provides limited-service life.

On-Shore Alternative Construction Methods

Gravity Sewer Line via Open Cut Construction and **Gravity Sewer Line via Trenchless Technology**, as described above in Section 2.6.1 are potential construction methods for the On-Shore Alternative. To facilitate the Gravity Sewer Line via Open Cut Construction method for the On-Shore Alternative, dewatering the work zone would be necessary. **Vacuum Sewers** are an additional potential construction method as described below.

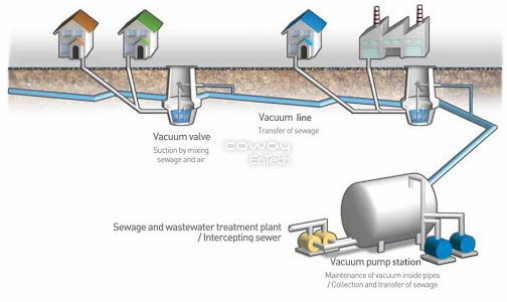
Gravity Sewer Line via Open Cut Construction

Gravity Sewer Line via Trenchless Technology

Vacuum Sewers

This open cut construction approach constructs a new pipeline that requires a partial vacuum to convey sewage at flat or reverse grades, and consequently can overcome many of the gravity and grade issues that the lake line system currently faces. Generally, these systems are more maintenance intensive than traditional gravity systems.

Vacuum Sewers



Coway Entech – Vacuum Sewer System

Upland Alternative Construction Methods

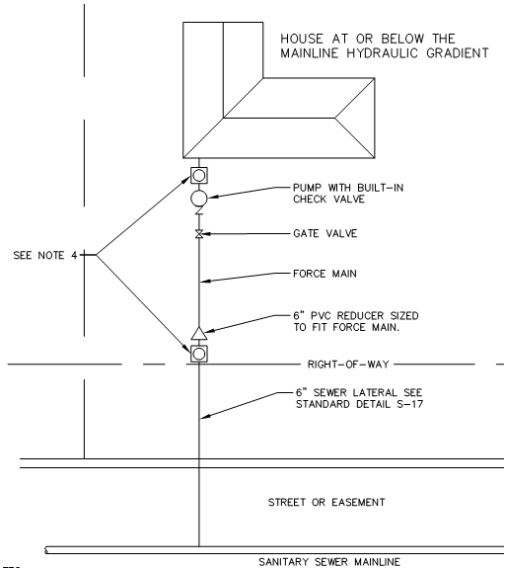
Gravity Sewer Line via Open Cut Construction and **Gravity Sewer Line via Trenchless Technology**, as described above in Section 2.6.1 are potential construction methods for the Upland Alternative. The gravity sewer line approach for the Upland Alternative would construct a new pipeline upland from the lake lines either within private property or along the roadway in City right-of-way using either open cut or trenchless construction. Construction of new side sewers could use open cut or trenchless technology to redirect flows away from the lake and toward the road. Dewatering the work zone would be necessary to facilitate the Upland Alternative open cut construction method.

Other potential construction methods include **Vacuum Sewers**, as described in Section 2.6.2 and **Grinder Pumps** described below. The vacuum sewer open cut construction approach for the Upland Alternative would be construction of a new pipeline away from the lake and would require a partial vacuum to convey sewage at flat or reverse grades.

Grinder Pumps

This trenchless or open cut construction approach (depending on location) constructs new grinder pumps to convey sewage up to the street and connect to either the existing sewer mainlines or new sewer lines in City right-of-way. Similar to the vacuum sewers, these would require additional infrastructure on private property, but multiple side sewers could be connected to a single grinder pump to reduce the amount of new infrastructure.

Grinder Pumps



City of Bellevue 2019 Sewer Engineering Standard Details – S-34 Single Home Sewer Pump System

Appendix C

Cultural Resources within the Plan Area

ESA

APPENDIX C
Cultural Resources within the Plan Area

Cultural Resources Assessments

Twenty-two prior cultural resource assessments have been conducted within the Plan area (**Table C-1**). No archaeological resources were identified within the Plan area; however, six surveys identified historic built environment resources within the Plan area, including residences and features of historic railroad lines (CH2M Hill and ICF Jones & Stokes 2009; ESA 2015; Gray 2008; Gray et al. 2011; ICF 2021; Ives et al. 2016). These surveys were completed for road and bridge improvements, drainage improvement, shoreline and stream restoration, and residential development.

TABLE C-1
PREVIOUS CULTURAL RESOURCES INVESTIGATIONS WITHIN THE LWWLL PLAN AREA

Service Area	Report Title	Citation (NADB No.)	Findings	NRHP Eligibility
Hunts Point & Yarrow Point	A Cultural Resources Assessment for Lakeside Bulkhead and Pier Improvements at 3423 Hunts Point Road	Baldwin et al. 2021 (1695715)	No cultural resources identified	N/A
Hunts Point & Yarrow Point	Cultural Resources Survey for Bulkhead Replacement Project at King County Assessor's Parcel 353490-0450	Boersema 2012 (1682231)	No cultural resources identified	N/A
Hunts Point & Yarrow Point	Cultural Resources Assessment for the Clapp Beach Restoration Project	Berger 2017 1689688	No cultural resources identified	N/A
Hunts Point & Yarrow Point	Cultural Resources Assessment 4053 Hunts Point Road	Yamamoto et al. 2021a (1694977)	No cultural resources identified	N/A
Hunts Point & Yarrow Point	Cultural Resources Assessment 4601 91st Place NE	Yamamoto et al. 2021b (1695094)	No cultural resources identified	N/A
Evergreen Point	Cultural Resources Survey of SR 520 Urban Partnership Agreement Variable Tolling Project, Evergreen Point Bridge	Gray 2008 (1352530)	Albert D. Rosellini Bridge/Evergreen Point Bridge	Determined Eligible
Evergreen Point	SR 520, Medina to SR 202: Eastside Transit and HOV Project Environmental Assessment, Historic Built Environment and Archaeological Resources Technical Memorandum	CH2M Hill and ICF Jones & Stokes 2009 (1353703)	3072 80th Ave NE 3100 80th Ave NE 3101 80th Ave NE 2857 Evergreen Point Rd 2879 Evergreen Point Rd 2827 Evergreen Point Rd	Not Eligible Not Eligible Not Eligible Not Eligible Not Eligible Not Eligible
Evergreen Point	Preliminary Ethnographic and Geoarchaeological Study of the SR 520 Bridge Replacement and HOV Project	Blukis Onat et al. 2005 (1680617)	No cultural resources identified	N/A

Service Area	Report Title	Citation (NADB No.)	Findings	NRHP Eligibility
Evergreen Point	SR 520 Bridge Replacement and HOV Program, I-5 to Medina: Bridge Replacement and HOV Project, Section 106 Technical Report: Volume I, Archaeology	Elder et al. 2011 (1681090)	No cultural resources identified	N/A
Evergreen Point	SR 520 Bridge Replacement and HOV Program, I-5 to Medina: Bridge Replacement and HOV Project, Section 106 Technical Report: Volume 2, Built Environment	Gray et al. 2011 (1681091)	3201 Evergreen Point Rd 2849 Evergreen Point Rd 2841 Evergreen Point Rd	Not Eligible Not Eligible Not Eligible
Evergreen Point	SR 520, Medina to SR 202: Eastside Transit and HOV Project, Local Connector Trail Archaeological Survey	Stevenson et al. 2011 (1681099)	No cultural resources identified	N/A
Evergreen Point	Cultural Resources Investigations in the SR 520, I-5 to Medina Lake Washington Geographic Segment	Elder and Schneyder 2012 (1682028)	No cultural resources identified	N/A
Evergreen Point	Results of Archaeological Monitoring of Geotechnical Borings within the SR 520 Limits of Construction	Elder and Reed 2011 1682029	No cultural resources identified	N/A
Evergreen Point	SR 520, Medina to SR 202: Eastside Transit and HOV Project Archaeological Monitoring Report	Manetas 2015 (1688193)	No cultural resources identified	N/A
Meydenbauer Bay	Results of an Archaeological Assessment of the Proposed Construction Project at 8925 Groat Point Drive in Medina	Kelly 2012 (1683424)	No cultural resources identified	N/A
Meydenbauer Bay	Cultural Resources Assessment Meydenbauer Bay Park Phase I	Bundy 2015 1687395	No cultural resources identified	N/A
Killarney	Cultural Resource Survey for the Beaux Arts Shoreline Restoration Project	Boersema and Trost 2012 (1681965)	No cultural resources identified	N/A
Newport South	Cultural Resources Inventory of the Proposed Washington Light Lanes Project	Juell 2001 (1339887)	No cultural resources identified	N/A
Newport South	Final Ripley Lane Pipeline Excavation Project (CIP #200799) Archaeological Resources Monitoring	Murphy and Larson 2003 (1341932)	No cultural resources identified	N/A
Newport South	Cultural Resources Survey for the Washington State Department of Transportation's I-405 Renton to Bellevue Improvement Project: SR 169 to I-90	Ives et al. 2016 (1689501)	Railroad features	Not Eligible
Newport South	Eastside Rail Corridor Regional Trail Master Plan Project, Historic and Cultural Resources	Environmental Science Associates 2015 (1691393)	Railroad features	Not Eligible
Newport South	Cultural Resources Discipline Report: I-405, Ripley Land Stream Connection Project	ICF 2021 (1695641)	5029 Ripley Lane N 5117 Ripley Lane N 5201 Ripley Lane N	Not Eligible Not Eligible Not Eligible

Built Environment Resources

Within the Plan area, 80 historic built environment resources have been recorded in WISAARD (**Table C-2**). The James G. Eddy House and Grounds (45KI173) is listed in the NRHP and WHR, and the Old Ferry Dock Building in Medina (45KI172) is listed in the WHR. Of the remaining 78 recorded properties, three have been determined eligible for listing on the NRHP, 25 have been determined not eligible for listing, and 50 have not been evaluated for listing. An additional 339 resources have been documented within the Plan area using information derived from the King County Assessor (DAHP 2022). These resources, however, have not undergone intensive-level recordation, nor have they been evaluated for their NRHP eligibility.

TABLE C-2
HISTORIC BUILT ENVIRONMENT RESOURCES WITHIN THE LWWLL PLAN AREA

Lake Line Area	Property ID.	Description / Address	Register Status
Hunts Point & Yarrow Point	85846	145 NE 35th Street, Bellevue	Determined not eligible
Hunts Point & Yarrow Point	727755	3858 Hunts Point Road, Bellevue	No determination
Hunts Point & Yarrow Point	290619	4232 Hunts Point Road, Bellevue	No determination
Hunts Point & Yarrow Point	38591	4205 Hunts Point Rd, Bellevue	No determination
Hunts Point & Yarrow Point	38590	4009 Hunts Point Rd, Bellevue	No determination
Medina South	641176	1605 73rd Ave NE, Medina	No determination
Medina South	41300	1231 76th Ave NE, Medina	No determination
Medina South	643472	1013 76th Ave NE, Medina	No determination
Medina South	45KI172	James G. Eddy House and Grounds 1005 Evergreen Point Road, Medina	Listed in NRHP and WHR
Medina South	45KI172	Old Ferry Dock Building – Medina 501 Evergreen Point Road, Medina	Listed in WHR
Medina South	642099	7755 Overlake Drive W, Medina	No determination
Medina South	718381	8345 Overlake Drive W, Medina	No determination
Medina South	642189	8731 Overlake Drive W, Medina	No determination
Evergreen Point	90968	3101 80th Ave NE, Bellevue	Determined not eligible
Evergreen Point	90969	3100 80th Ave NE, Bellevue	Determined not eligible
Evergreen Point	90973	3072 80th Ave NE, Bellevue	Determined not eligible
Evergreen Point	96535	3267 Evergreen Point Road, Medina	Determined eligible
Evergreen Point	96534	3261 Evergreen Point Road, Medina	Determined not eligible
Evergreen Point	96533	3201 Evergreen Point Road, Medina	Determined not eligible
Evergreen Point	48540	Governor Albert D. Rosellini Bridge/ Evergreen Point Bridge	Determined eligible
Evergreen Point	90970	2879 Evergreen Point Road, Medina	Determined not eligible
Evergreen Point	90949	2857 Evergreen Point Road, Medina	Determined not eligible
Evergreen Point	96536	2849 Evergreen Point Road, Medina	Determined not eligible
Evergreen Point	96538	2841 Evergreen Point Road, Medina	Determined not eligible
Evergreen Point	90972	2827 Evergreen Point Road, Medina	Determined not eligible
Evergreen Point	96539	2651 Evergreen Point Road, Medina	Determined not eligible

Lake Line Area	Property ID.	Description / Address	Register Status
Evergreen Point	96532	2617 Evergreen Point Road, Medina	Determined not eligible
Meydenbauer Bay	41290	100 Overlake Drive E, Medina	No determination
Meydenbauer Bay	41286	426 87th Ave NE, Medina	No determination
Meydenbauer Bay	643790	508 Upland Road, Medina	No determination
Meydenbauer Bay	283269	515 Overlake Drive E, Medina	No determination
Meydenbauer Bay	38608	9011 Lake Washington Blvd NE, Bellevue	No determination
Meydenbauer Bay	38611	9440 Lake Washington Blvd NE, Bellevue	No determination
Meydenbauer Bay	420672	Lake Washington Blvd NE, Bellevue	No determination
Meydenbauer Bay	38609	9620 Lake Washington Blvd NE, Bellevue	No determination
Meydenbauer Bay	672901	9807 Lake Washington Blvd NE, Bellevue	Determined not eligible
Meydenbauer Bay	672861	9815 Lake Washington Blvd NE, Bellevue	Determined not eligible
Meydenbauer Bay	375093	1 99th Ave NE, Bellevue	Determined not eligible
Meydenbauer Bay	672621	2 99th Ave NE, Bellevue	Determined eligible
Meydenbauer Bay	641947	3 99th Ave NE, Bellevue	Determined not eligible
Meydenbauer Bay	38610	9905 Lake Washington Blvd NW, Bellevue	No determination
Meydenbauer Bay	38576	1 100th Ave NE	No determination
Meydenbauer Bay	38605	9927 Meydenbauer Way SE, Bellevue	No determination
Meydenbauer Bay	295668	9528 Shoreland Drive SE, Bellevue	No determination
Killarney	38606	415 Shoreland Drive SE, Bellevue	No determination
Killarney	725510	700 Shoreland Drive SE, Bellevue	No determination
Killarney	719973	901 Shoreland Drive SE, Bellevue	No determination
Killarney	38601	1231 112th Ave NE, Bellevue	No determination
Killarney	718992	1919 Killarney Way, Bellevue	No determination
Killarney	707033	2055 Killarney Way, Bellevue	No determination
Killarney	451588	2401 Killarney Way, Bellevue	No determination
Killarney	728078	15 Enatai Drive, Bellevue	No determination
Killarney	54099	3251 106th Ave SE, Bellevue	Determined not eligible
Killarney	54100	3257 106th Ave SE, Bellevue	Determined not eligible
Killarney	54101	3266 106th Ave SE, Bellevue	Determined not eligible
Killarney	54102	3270 106th Ave SE, Bellevue	Determined not eligible
Killarney	54103	3273 106th Ave SE, Bellevue	Determined not eligible
Killarney	55997	3461 108th Ave SE, Bellevue	Determined not eligible
Newport South	705489	6633 Lake Washington Blvd SE, Bellevue	Determined not eligible
Newport South	41853	6017 Lake Washington Blvd SE, Renton	No determination
Newport South	41854	6031 Lake Washington Blvd SE, Renton	No determination
Newport South	48926	5851 Pleasure Point Lane SE, Renton	No determination
Newport South	48951	6322 108th Ave SE, Renton	No determination
Newport South	48950	6402 108th Ave SE, Renton	No determination
Newport South	48959	6431 Ripley Lane SE, Renton	No determination

Lake Line Area	Property ID.	Description / Address	Register Status
Newport South	48960	6603 Ripley Lane SE, Renton	No determination
Newport South	48961	6611 Ripley Lane SE, Renton	No determination
Newport South	48962	6615 Ripley Lane SE, Renton	No determination
Newport South	48963	6619 Ripley Lane SE, Renton	No determination
Newport South	48964	6631 Ripley Lane SE, Renton	No determination
Newport South	48965	6811 Ripley Lane SE, Renton	No determination
Newport South	48966	6819 Ripley Lane SE, Renton	No determination
Newport South	48967	6823 Ripley Lane SE, Renton	No determination
Newport South	48968	6827 Ripley Lane SE, Renton	No determination
Newport South	48969	7005 Ripley Lane SE, Renton	No determination
Newport South	48970	7009 Ripley Lane SE, Renton	No determination
Newport South	48971	7011 Ripley Lane SE, Renton	No determination
Newport South	48972	5301 Ripley Lane N, Renton	No determination
Newport South	48973	5221 Ripley Lane N, Renton	No determination
Newport South	722402	5201 Ripley Lane N, Renton	Determined not eligible

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